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Aims & Scope

The journal **S**imulation **N**ews **E**urope (SNE) publishes information related to modelling and simulation. SNE's aims are i) to inform about new developments in simulation methods and applications by means of technical notes, comparisons, etc., ii) to report news from European simulation societies and events from international simulation societies and groups all over the world, and iii) to act as official membership journal of EUROSIM and SCS Europe.

SNE contains news on EUROSIM, on the EUROSIM societies, on SCS Europe and on other international Simulation Societies and groups. Furthermore SNE presents "simulation centres" and introduces simulationists. A calendar of simulation conferences and a hotlinks list (both database -driven) conclude the *news section*.

Archive Section. SNE publishes technical notes and short notes: general overviews or new developments, new software and hardware, new applications and methods. Industry news inform about new products, etc. Due to co-operation with publishers SNE reviews most recent books on modelling, simulation, mathematics and computer engineering. The special series "Comparison of Simulation Technique and Simulation Software" (ARGESIM Comparisons) gives a comprehensive overview on developments of simulation technique and software.

SNE is a printed journal as well as an electronic journal, which is reflected by the *archive section* and the *news section*. The *news section* (inner pages of SNE) can be found on the web one-to-one, contribution in the *archive section* (outer pages) are administrated by a database with WWW - interface:

http://www.argesim.org/sne/

All contributions are selected and may be edited. If you want to publish news or if you want information about publication in the archive section, please send news to the corresponding member of the reports editorial board (p. XXXVII), or contact a member of the general editorial board (p. 52), or the editor-in-chief.

Editorial

Dear readers,

This double issue of SNE is the result of our re-organisation in summer 2000. We had to put SNE on a broader basis, and we had to observe to developments in web publishing.

The broader basis is reflected by an increase of the editorial board: a reports editorial board takes care on news from societies and general news as before, another new editorial board is responsible for the information on developments, trends, etc.

As news are more and more published on the web, we are following a strategy suggested by Elsevier: news (information of "news value") are published at the web as well as three times a year in SNE's news section (with some additional information), information of "archive value" is prepared by the editorial board and printed in SNE's archive section (evaluations published database - driven on the web).

The highlights of this issue are two Technical Notes, the one about the MODELICA standardisation, the other about choice of discrete simulators. Short Notes briefly sketch drug models, MDL - descriptions and supply-chain models. The book reviews show a new design with classifications, and a new section "Simulationists" introduces young researchers and reports on awards. The series of ARGESIM comparisons is continued by 11 new solutions, for 2001 two new comparisons are prepared. In order to allow a better evaluation, the solutions follow now a template.

I hope, you enjoy this issue, and I thank all authors and members of editorial boards for their co-operation

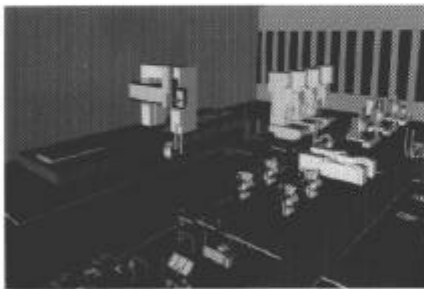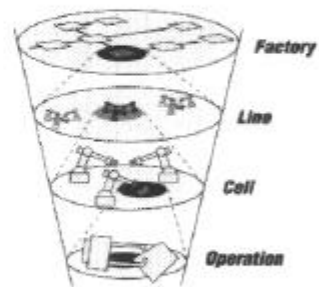*Felix Breitenecker, editor-in-chief*
Felix.Breitenecker@tuwien.ac.at

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TECHNICAL NOTES

Modelica -
Language, Libraries, Tools, Workshop and EU-Project

Martin Otter and Hilding Elmqvist

DLR Oberpfaffenhofen, Germany and Dynasim AB, Lund, Sweden

Modelica is a new language for convenient modeling of physical systems. In this article an overview about the language features is given, the organisation behind the language development, available Modelica libraries and Modelica simulation environments, the recent, first workshop about Modelica and the EU-Project RealSim to enhance hardware-in-the-loop simulation and design optimization techniques on the basis of Modelica.

1. Modelica - An Overview

Modelica is a freely available, object-oriented language for modeling of large, complex, and heterogeneous physical systems. It is suited for multi-domain modeling, for example, mechatronic models in robotics, automotive and aerospace applications involving mechanical, electrical, hydraulic and control subsystems, process oriented applications and generation and distribution of electric power. Modelica is designed such that it can be utilized in a similiar way as an engineer builds a real system: First trying to find standard components like motors, pumps and valves from manufacturers' catalogues with appropriate specifications and interfaces and only if there does not exist a particular subsystem, a component model would be newly constructed based on standardized interfaces.

Models in Modelica are mathematically described by *differential, algebraic* and *discrete equations*. No particular variable needs to be solved for manually. A Modelica tool will have enough information to decide that automatically. Modelica is designed such that available, specialized algorithms can be utilized to enable efficient handling of large models having more than hundred thousand equations. Modelica is suited (and used) for hardware-in-the-loop simulations and for embedded control systems.

Reuse is a key issue for handling complexity. There have been several attempts to define object-oriented languages for physical modeling. However, the ability to reuse and exchange models relies on a standardized format. It was thus important to bring this expertise together to unify concepts and notations. The Modelica design effort was initiated by

Hilding Elmqvist and started in September 1996 within an action of the ESPRIT project "Simulation in Europe Basic Research Working Group (SiE-WG)". The language has been designed by the developers of the object-oriented modeling languages Allan, Dymola, NMF, ObjectMath, Omola, SIDOPS+, Smile und a number of modeling practitioners in different domains. After 19 three-day meetings, during a 3-year period, version 1.3 of the language specification was finished in December 1999. This is the version currently used in actual applications. In December 2000, an update of the language, version 1.4, will be published. Detailed information about Modelica can be downloaded from:

In February 2000, a non-profit, non-governmental organization was founded for the further development, promotion and application of the Modelica

Modelica Homepage:	`http://www.Modelica.org/`
Modelica Tutorial:	`http://www.Modelica.org/current/ModelicaRationale13norev.pdf`
Modelica Specification:	`http://www.Modelica.org/current/ModelicaSpec13norev.pdf`
Modelica Libraries:	`http://www.Modelica.org/library/library.html`

language. The name of the organisation is "Modelica Association". The association has its seat in Linköping, Sweden and owns and administrates incorporeal rights related to Modelica, including but not limited to trademarks (such as the Modelica trademark), the Modelica Language Specification, Modelica Standard Libraries, etc., which should be freely available for the promotion of industrial development and research. Membership in the association is open to individual persons and to organizations The current board of the Modelica Association consists of the following persons:

- Chairman: Martin Otter, DLR Oberpfaffenhofen, Germany
- Vice-Chairman: Peter Fritzson, Linköping University, Sweden
- Secretary: Hilding Elmqvist, Dynasim AB, Lund, Sweden (former Chairman)
- Treasurer: Michael Tiller, Ford Motor Company,
- Dearborn, U.S.A.
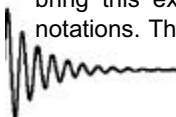
2. Features of the Modelica Language

Modelica supports both high level modeling by composition and detailed library component modeling by equations. Models of standard components are typically available in model libraries. Using a graphical model editor, a model can be defined by drawing a composition diagram by positioning icons that represent the models of the components, drawing connections and giving parameter values in dialogue boxes. Constructs for including graphical annotations in Modelica make icons and composition diagrams portable between different tools. Typical composition diagrams in different domains are shown in the figure below.
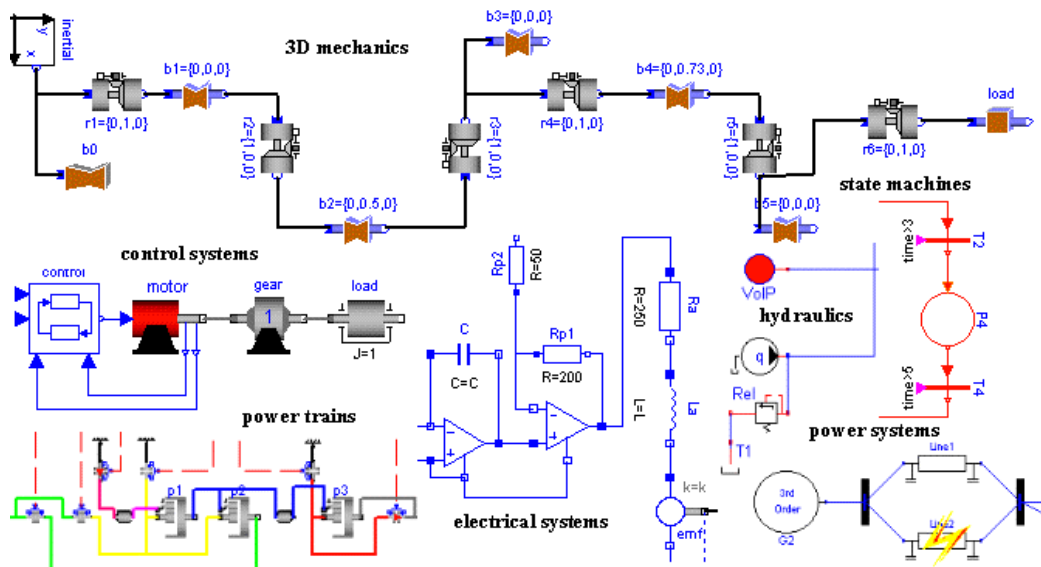
An example of a composition diagram of a simple motor drive system is shown in the figure below.
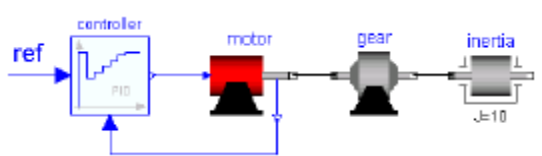
The system can be broken up into a set of connected components: an electrical motor, a gearbox, a load and a control system. The textual representation of this Modelica model is (graphical annotations are not shown):

```
model MotorDrive
  PID         controller;
  Motor       motor;
  Gearbox     gear    (n=100);
  Inertia     inertia(J=10);
```

```
equation
  connect(controller.outPort, motor.inPort);
  connect(controller.inPort2, motor.outPort);
  connect(gear.flange_a    , motor.flange_b);
  connect(gear.flange_b    , inertia.flange_a);
end MotorDrive;
```

It is a composite model which specifies the topology of the system to be modeled in terms of components and connections between the components. The statement "`Gearbox  gear(n=100);`" declares a component `gear` of model class `Gearbox` and sets the value of the gear ratio, `n`, to `100`. A component model may be a composite model to support hierarchical modeling. The composition diagram of the model class `Motor` is shown in the next figure.
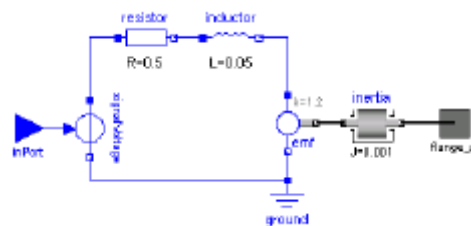
The meaning of connections will be discussed below as well as the description of behavior on the lowest level using mathematical equations.

Physical modeling deals with the specification of relations between physical quantities. For the drive system, quantities such as angle and torque are of interest. Their types are declared in Modelica as

```
type Angle  = Real(quantity="Angle" ,
unit="rad", displayUnit="deg");
type Torque = Real(quantity="Torque",
unit="N.m");
```

where `Real` is a predefined type, which has a set of attributes such as name of quantity, unit of measure, default display unit for input and output, minimum, maximum, nominal and initial value. The Modelica Standard Library, which is an intrinsic part of Modelica, includes about 450 of such type definitions based on ISO 31-1992.

Connections specify interactions between components and are represented graphically as lines between connectors. A connector should contain all quantities needed to describe the interaction. Voltage and current are needed for electrical components. Angle and torque are needed for drive train elements:

```
connector Pin          connector Flange
   Voltage      v;     Angle       phi;
   flow Current i;     flow Torque tau;
end Pin;               end Flange;
```

A connection, connect(Pin1, Pin2), with Pin1 and Pin2 of connector class Pin, connects the two pins such that they form one node. This implies two equations, Pin1.v = Pin2.v and Pin1.i + Pin2.i = 0. The first equation indicates that the voltages on both branches connected together are the same, and the second corresponds to Kirchhoff's current law saying that the current sums to zero at a node. Similar laws apply to mass flow rates in piping networks and to forces and torques in mechanical systems. The sum-to-zero equations are generated when the prefix flow is used in the connector declarations. The Modelica Standard Library includes also connector definitions.

An important feature in order to build reusable descriptions is to define and reuse **partial** models. A common property of many electrical components is that they have two pins. This means that it is useful to define an interface model class `OnePort`, that has two pins, `p` and `n`, and a quantity, `v`, that defines the voltage drop across the component.

```
partial model OnePort
   Pin       p, n;
   Voltage v;
equation
   v = p.v - n.v;
   0 = p.i + n.i;
end OnePort;
```

The equations define common relations between quantities of a simple electrical component. The key-

word **partial** indicates that the model is incomplete and cannot be instantiated. To be useful, a constitutive equation must be added. A model for a resistor extends `OnePort` by adding a parameter for the resistance and Ohm's law to define the behavior.

```
model Resistor "Ideal resistor"
   extends OnePort;
   parameter Resistance R;
equation
   R*p.i = v;
end Resistor;
```

A string between the name of a class and its body is treated as a comment attribute. Tools may display this documentation in special ways. The keyword parameter specifies that the quantity is constant during a simulation experiment, but can change values between experiments.

The most basic Modelica language elements have been presented. Modelica additionally supports arrays, utilizing a Matlab like syntax. The elements of arrays may be of the basic data types (Real, Integer, Boolean, String) or in general component models. This allows convenient desription of simple discretized partial differential equations. A unique feature of Modelica is the handling of discontinuous and variable structure components such as relays, switches, bearing friction, clutches, brakes, impact, sampled data systems, automatic gearboxes etc. Modelica has introduced special language constructs allowing a simulator to introduce efficient handling of events needed in such cases. Special design emphasis was given to synchronization and propagation of events and the possibility to find consistent restarting conditions. Finally, a powerful package concept is available to structure large model libraries and to find a component in a file system giving its hierarchical Modelica class name.

3. Modelica Libraries

In order that Modelica is useful for *model exchange*, it is important that libraries of the most commonly used components are available, ready to use, and sharable between applications. For this reason, the Modelica Association develops and maintains a growing *Modelica Standard Library*.

Furthermore, other people and organizations are developing free and commercial Modelica libraries.

TECHNICAL NOTES
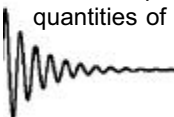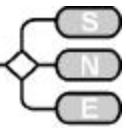
For more information and especially for downloading the free libraries, see

http://www.Modelica.org/library/library.html.

Currently, component libraries are available in the following domains:

- About 450 type definitions, such as Angle, Voltage, Inertia.
- Mathematical functions such as sin, cos, In
- Continuous and discrete input/output blocks, such as transfer functions, filters, sources.
- Electric and electronic components such as resistor, diode, MOS and BJT transistor.
- 1-dim. translational components such as mass, spring, stop.
- 1-dim. rotational components such as inertia, gearbox, planetary gear, bearing friction, clutch.
- 3-dim. mechanical components such as joints, bodies and 3-dim. springs.
- Hydraulic components, such as pumps, cylinders, valves.
- Thermo-fluid flow components, such as pipes with multi-phase flow, heat exchangers.
- 1-dim. thermal components, such as heat resistance and heat capacitance.
- Power system components such as generators and lines.
- Power train components such as driver, engine, torque converter, automatic gearboxes.

Component libraries are realized by specialists in the respective area, taking advantage of the new features of Modelica. The Modelica Association is very interested in the development of further libraries. If you would like to contribute, please contact Martin Otter (Martin.Otter@dlr.de).

4. Modelica Simulation Environments

In order that the Modelica language and the Modelica libaries can be utilized, a Modelica translator is needed which transforms a Modelica model into a form which can be efficiently simulated in an appropriate simulation environment.

The Modelica language itself is a relatively small language since there is only one basic structuring unit, a *class*, and all other structuring units, such as *model, connector, function, package, record* are just specializations of it. Therefore, it is straightforward to develop with reasonable effort an appropriate Modelica translator which reads a Modelica model and transforms it into a set of differential, algebraic and discrete equations. A free Modelica parser which reads a Modelica

model and constructs an abstract syntax tree is available at:

http://www.Modelica.org/tools/parser/Parser.shtml.

However, solving this initial set of equations directly with a numerical method is both unreliable and very unefficient. One reason is that many Modelica models, like the mechanical ones, have a DAE index of 2 or 3, i.e., the overall number of states of the model is less than the sum of the states of the subcomponents. In such a case, every direct numerical method has the difficulty that the numerical condition becomes worse, if the integrator step size is reduced and that a step size of zero leads to a singularity. Another problem is the handling of idealized elements, such as ideal diodes or Coulomb friction. These elements lead to *mixed* systems of equations having both *Real* and *Boolean unknowns*. Specialized algorithms are needed to solve such systems reliably.

Modelica was designed such that symbolic transformation algorithms can (and have to) be applied to transform the original set of equations into a form which can be integrated with standard methods. For example, the algorithm of Pantelides has to be applied to differentiate certain parts of the equations in order to reduce the index. Realization of such transformation algorithms is difficult and requires a lot of knowledge and implementation work. For this reason, currently no free Modelica simulation environment is available.

However, since June 2000, nearly the complete Modelica language is supported by the modeling and simulation environment *Dymola*. Dymola, commercially available since 1993, has now a Modelica translator which is able to perform all necessary symbolic transformations for large systems (> 100 000 equations). Currently, all Modelica applications are modeled and simulated with this environment. All the figures above are screenshots of Dymolas composition diagram editor. A demo version can be downloaded from

http://www.Dynasim.se.

For the control community it is important, that Dymola can generate Simulink S-Functions of a Modelica model in CMEX format. This allows to model a plant very conveniently with Modelica (which is tedious or impossible in Simulink for larger systems), utilize it as one input/output block in SIMULINK, realize controllers and filters in Simulink and utilize all the analysis and design capabilities of Matlab/Simulink.
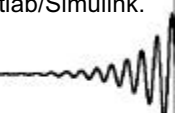
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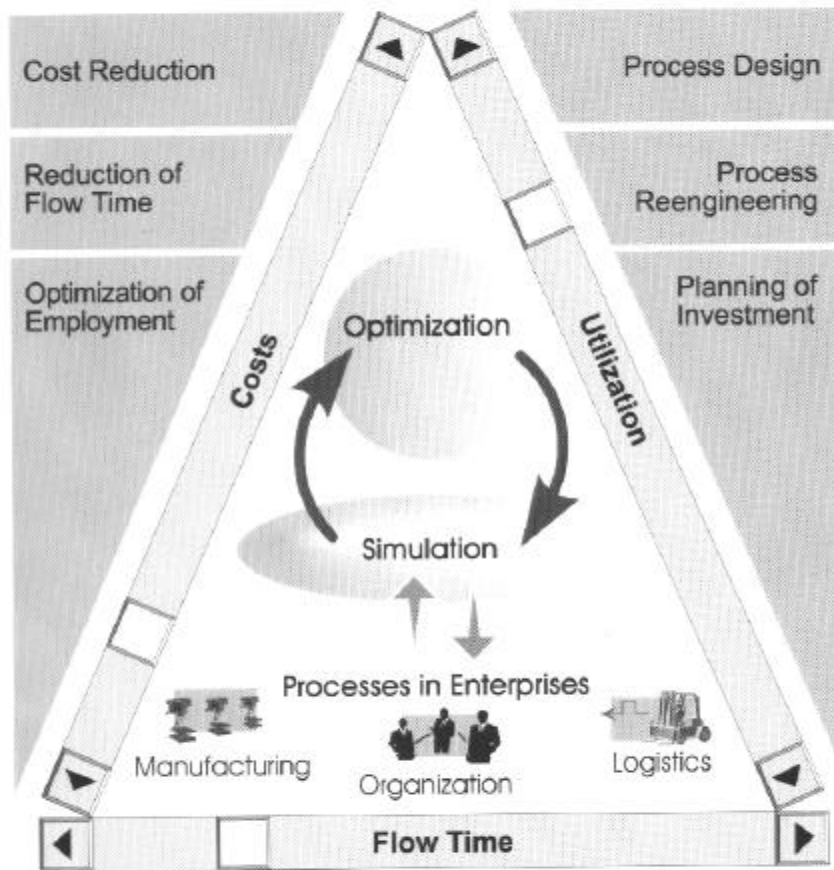
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5. Modelica Workshop'2000

On Oct. 23 - 24, 2000, the Modelica Association organized a *workshop* at Lund University, Department of Automatic Control, Lund, Sweden, to bring together Modelica end users with Modelica language designers, Modelica tool vendors and Modelica library developers. Furthermore, a Dymola user's group meeting took place. The organizers were very pleased to welcome 85 participants, more than twice the expected number.

A 3 hour tutorial on Modelica was organized for 35 paricipants. Two rooms with 20 PCs were available, so that 1-2 participants could solve various modeling tasks at one PC. The time of one hour for the "hands-on-excersises" was a little bit short, but the participants enjoyed to solve even quite envolved modeling tasks such as modeling of a 3-shift automatic gearbox.

Most of the about 20 presentations had a high quality and an impressive breadth in the field of modeling with Modelica was presented, such as modeling of electronic systems, electrical power systems, electrical motors, hydraulic systems, thermo-hydraulic systems, vehicle power trains, fuel cell powered drive trains, and 3-dim. vehicle mechanics. New tools have been presented, such as MathModelica and an outlook on future developments have been given, such as modeling of partial differential equations and dimensional analysis of equations. All papers of the workshop are available in pdf-format for download at the Modelica home page.

Highlights of the presentations have been advanced applications of Modelica and Dymola in hardware-in-the-loop simulations and simulations of huge Modelica models:

- Anton Schiela and Hans Olsson presented a new method called "mixed mode integration" which is designed for real-time simulation of Modelica models and demonstrated their method online on a 650 Mhz PC for the real-time simulation of the full model of a robot with control system (78 states), containing stiff and non-stiff equations using a step-size of 1 ms, online tuning of the desired robot paths and CAD-data based real-time visualization. Using an explicit Euler method would have required a step size of 0.05 ms.
- Michael Tiller presented the biggest Modelica model ever simulated (the original model has 260 000 equations and after symbolic processing with Dymola about 25 000 nontrivial algebraic equations and 300 states). This is the result of a feasi-

bility study at Ford Motor Company to evaluate the properties of Modelica and Dymola for detailed vehicle modeling

Due to the great success of this workshop it was decided to repeat it. The date and location will be decided on the next Modelica meeting which will take place on Feb. 7 - 9, 2001.

6. EU-Project RealSim

In January 2000, the EU project RealSim (Real-time Simulation for Design of Multi-Physics Systems) started, where Modelica is used as a basis. The primary goals of this project are:

- To develop tools for efficient simulation of *complex*, tightly-coupled *multi-physics* systems, with *real-time constraints*.
- To reduce product development cost and time by *design optimization* and by *hardware-in-the-loop simulation* for assessment, training and test automation purposes.

Especially, the current technological basis for Modelica shall be further improved:

1. Symbolic transformation of large scale Modelica models (> 100 000 equations) to generate efficient C-code for real-time applications.
2. Parallel and distributed simulation to enhance the performance of hardware-in-the-loop simulation and of multi-criteria optimization.
3. Multi-criteria optimization based on distributed simulations.
4. Closely integrated Modelica modeling and simulation environment with interactive experimentation, design optimization and visualization.
5. More information about this project is available under http://www.ida.liu.se/~pelab/realsim/.

7. Outlook

All necessary ingredients for modeling and simulation of industrial applications with Modelica are available: The language, libraries, tools and successful applications. Therefore, it can be expected that Modelica will have a significant impact in the modeling and simulation community in the future. The Modelica Association is very interested to further adapt the Modelica language to the needs of the end-users and to further develop the Modelica libraries. Interested simulation professionals who would like to contribute are encouraged and invited to participate at the design meetings (see the Modelica homepage for details).

Current and Future Developments in Discrete-Event Simulation Software - Users' Views

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1. Introduction

This paper presents a summary of the results of a survey on the use of discrete-event simulation software, which was sponsored by Brunel University. The survey has been carried out in 1997 mainly to discover how the users are satisfied with current simulation software they use and how this software can be further improved. Participants in this survey are members of the Simulation Study Group of the Operational Research Society of Great Britain both from academic and industrial institutions.

A similar survey (Hlupic and Paul, 1993) was carried out in 1992 which included participants from both educational institutions and industrial companies around Europe, for whom it was known or believed to be regular users of simulation.

There is a significant degree of similarity between the results obtained for both surveys which indicates that the same problems with simulation software specified in previous survey still exist and that UK users' opinion about simulation software is similar to that of their European colleagues. A review of other, similar survey studies on simulation software is provided in (Hlupic, 1999) as well as a full set of results obtained in this ORS Survey.

The paper is structured as follows. A summary of the survey conducted in this research is presented with an emphasis on current and future developments in simulation software. The results obtained are analysed and conclusions that outline the main findings of this research are drawn.

2. Simulation Study Group Survey

The main objective of the survey was to investigate the users' opinion about current and future developments in discrete-event simulation software. The survey sample includes members of the Simulation Study Group (special interest group) of the Operational Research Society of Great Britain, both from industry and academic institutions. It was believed that survey participants were actively involved in simulation (the results of the survey have confirmed that

assumption) and /or had a substantial interest in simulation.

A number of academics from universities across Great Britain have participated in the survey as well as participants from the industry working for various manufacturing, service, consulting and research companies. Full details about the questionnaire used for the survey are provided in (Hlupic, 1999).

The survey sample was not selected by any formal statistical method. The participants, for whom it was known or believed to be regular users of simulation, were selected deliberately. The response rate was reasonable 25% out of 220 distributed questionnaires. The ratio of responses from universities and responses from industry is about 66% to 33%, although an approximately equal number of the questionnaires were distributed to each group of users.

The response rate was significantly higher from the users from universities, and in average each response from academic participants provided more information then the response from the users in industry.

All these facts might raise the question of statistical significance of obtained results. However, it is believed that intentional selection of survey participants experienced in simulation enhances the importance and representativeness of results.

3. Main Findings of the Survey
3.1. General Observations

The results of the survey summarise the responses obtained from the participants of the survey. As such, they should be considered with caution, as survey sample is relatively small.

However, there is a certain degree of consistency amongst survey participants in providing some answers related to general characteristics and positive and negative features of simulation software, which could indicate that some findings might be applicable to a wider simulation community.

The main results of the survey are presented in Tables 1-4. Information in these tables is presented in
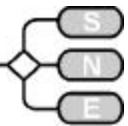
similar manner. Items in rows were grouped according to percentages of users that specified certain software features.

Each percentage (in a specific row) is calculated as a proportion of 100%, and the rules of arithmetic cannot be applied to all percentages in a certain column (percentages in one column cannot total 100%).

3.2. Current Developments in Discrete-Event Simulation Software

Users' views on current developments in discrete-event simulation software (together with the percentage of users that have specified a certain software feature) are summarised in Tables 1, 2, and 3; indicating a general opinion about software currently being used, the main limitations and the main positive features.

SOFTWARE FEATURES	PERCENTAGE OF USERS (%) THAT SPECIFIED A CERTAIN SOFTWARE FEATURE
Lack of modelling facilities /flexibility	37%
Extensive modelling facilities /flexibility	33.3%
Easy to use	18.5%
Difficult to learn	18.5%
Expensive	14.8%
Good for teaching	14.8%
Inexpensive and good value	11.1%
Easy to learn	11.1%
Dated	11.1%
Good for developing models of real systems	11.1%
Good graphical interface	7.4%
Models are easy to develop	7.4%
Difficult to link to other software	7.4%
Lack of language interface	7.4%
Powerful tool	7.4%
Lack of good user interface	3.7%
Average modelling facilities	3.7%
Slow to run	3.7%
Good speed	3.7%
Poor logic facilities	3.7%
Simple	3.7%
Good automatic statistics collection	3.7%
Lack of hierarchical/modular approach	3.7%
Ease of animation	3.7%
Easy to use	3.7%
Good value for the price	3.7%
Presentable	3.7%
Easy to create reusable code	3.7%
Inadequate graphic front end	3.7%
It takes long to develop models	3.7%

Table 1: A summary of users' general opinion about software currently used

SOFTWARE LIMITATIONS	PERCENTAGE OF USERS (%) THAT SPECIFIED A CERTAIN LIMITATION OF SOFTWARE
Limited standard features/flexibility	22.2%
Difficult to learn	14.8%
Expensive	14.8%
Inadequate guidance in experimentation (advice related to, for example, the duration of experimental run, the number of replications needed or to the combination of input factors is needed)	11.1%
Lack of software compatibility	7.4%

SOFTWARE LIMITATIONS	PERCENTAGE OF USERS (%) THAT SPECIFIED A CERTAIN LIMITATION OF SOFTWARE
Lack of output analysis facilities	7.4%
Data input	7.4%
Dated	7.4%
High cost of support and training	3.7%
Use of dongle (security device)	3.7%
Lack of on-line help	3.7%
Lack of complex languages within the package	3.7%
Inadequate processing power	3.7%
Inadequate graphical accuracy	3.7%
Lack of real-time accuracy	3.7%
Poor logic	3.7%
Too much distracting emphasis on animation	3.7%
No access to system events	3.7%
Poor facilities for developing own user interface	3.7%
Slow	3.7%
Difficulty of validating models	3.7%
Lack of portability	3.7%
Requires too much expertise	3.7%
Output presentation	3.7%
Inadequate user interface	3.7%
No possibility for stand alone executable models	3.7%
The lack of ability to build a modular type of simulation	3.7%
Crude results package	3.7%
Need to have more work entries in a model then correspond to reality	3.7%
The use of dummy work-centres	3.7%
Lack of the integration of scheduling and simulation packages	3.7%
Initialisation	3.7%

Table 2: A summary of users' opinion about the main limitations of software currently used

MAIN POSITIVE FEATURES OF SOFTWARE	PERCENTAGE OF USERS (%) THAT SPECIFIED A CERTAIN POSITIVE SOFTWARE FEATURE
Ease of modelling	48.1%
Good animation/visual facilities	44.4%
Modelling speed	22.2%
Flexibility/linking to external code	18.5%
Graphical interface	7.4%
Input and output data analysis features	3.7%
Linking to other packages	3.7%
Low price	3.7%
Ease of statistics collection	3.7%
Interactivity	3.7%
Variable animation speed	3.7%
Modularization of models (developing models in separate parts)	3.7%
The results summary	3.7%
Virtual reality features	3.7%
Number crunching (advanced arithmetic features)	3.7%
Unlimited functionality via C coding	3.7%
Easy to create reusable code	3.7%
Portability (use on different hardware platforms)	3.7%

Table 3: A summary of users' opinion about the most important positive features of software currently used

TECHNICAL NOTES

3.3 Future Developments in Discrete-Event Simulation Software

Table 4 summarises responses related to future developments in simulation software, emphasising features that users would like to be improved and/or added to current simulation packages.

FUTURE DEVELOPMENTS (DESIRED SOFTWARE FEATURES)	PERCENTAGE OF USERS (%) THAT SPECIFIED A CERTAIN DESIRED SOFTWARE FEATURE
Better experimentation support	18.5%
Further developments making packages easier to learn and use	11.1%
Better links with other packages	11.1%
Better analysis of results and data displays	7.4%
Extensive standard features	7.4%
Internal system for creating user logic	7.4%
More but easier flexibility	7.4%
Output design and analysis	7.4%
Iconic programming/graphical model building	7.4%
Better presentation of the model on the screen and in the printout	7.4%
An "intelligent" interface that would advise in number of replications, warm up period, batch size etc.	3.7%
Virtual reality	
Complete accuracy with the physical world	3.7%
Real-time animation	3.7%
Access to system events	3.7%
Good facilities for developing own user interface (to create sub-simulators)	3.7%
Facilities for batch running and collection of statistics	3.7%
Better Graphical User Interface	3.7%
Better statistical facilities	3.7%
Extra blocks to support various application areas	3.7%
Stand alone executable models	3.7%
Model pre-analyser	3.7%
Optimisation facilities	3.7%
Time series analysis	3.7%
Tutorial distribution fitting	3.7%
Library of reusable models	3.7%
Completeness check	3.7%
Multimedia features	3.7%
Interactive handling of parameters during execution of experiments Confidence intervals	3.7%
Hypothesis testing	
Graphical display of simulation output	3.7%
A several purpose library of facilities to extract ready-built components of simulation	3.7%
Ability to do IF/THEN/ELSE logic	3.7%
A facility to print out by one command, all the parameter values, object specifications and routings/logic within a model	3.7%
A cross referencing capability, that is providing ready answers to questions such as where are all references to a given attribute to be found	3.7%

Table 4: A summary of users' opinion about the features that should be included in simulation software

4. Survey Findings An Analysis

A general opinion about software currently used shows that the main objection by the users is that software is lacking extensive modelling facilities and flexibility (although at the same time a slightly smaller percentage of users indicated the opposite, i.e. that packages do provide extensive facilities and flexibility). A significant percentage of survey participants indicated that software is in general easy to use, but difficult to learn. Slightly smaller percentage of the users indicated that software is expensive, but good for teaching.

The main software limitations for survey participants are limited software flexibility, difficulty of learning and high price of software packages. Other notable problems include inadequate guidance in experimentation, lack of software compatibility, lack of facilities for output analysis, problems with data input and the age of software packages. A complaint about the lack of flexibility is probably caused by a significant majority of survey participants using simulators, which are believed to be less flexible than simulation or general purpose languages.

According to the users' responses it is apparent that the main positive feature is the ease of model development (although at the same time users find software to be difficult to learn). Almost half of survey participants consider animation and visual facilities to be important positive feature of simulation packages. Other notable features specified are modelling speed, flexibility and graphical user interface.

Future developments desired by users vary considerably, showing that software preferences are to a large extent matter of an individual taste and expectations. Some of the common features specified by participants are better experimental support, better links with other packages and further developments to make packages easier to learn and use.

A smaller percentage of participants would like packages to provide better analysis of results, more extensive standard features, internal system for creating user logic, more but easier flexibility, better facilities for output design and analysis, iconic programming and better presentation of models. There are also dozens of other desirable features specified by less than 4% of participants, which is mainly a result of an open-ended style of questions that enabled users to express personal views and preferences.

5. Conclusions

This survey reveals to what extent the users are satisfied with software they currently use and how they would like this software to be further improved. A general analysis of all results obtained shows that simulation software currently being used by all participant in this survey is predominantly easy to use, with good visual facilities, but too limited for complex and non-standard problems, too expensive and incapable of providing adequate guidance in experimentation.

Further limitations discovered include difficulty of learning packages, lack of software compatibility, lack of output analysis facility, lack of complex languages integrated with a package and so on.

Future software developments desired by users dominantly refer to more assistance in experimental design (related to, for example, the duration of experimental run, the number of replications needed or the combination of input factors to be used for a particular run), easier to learn and use packages and improved software compatibility (easier and better integration with other packages such as database management tools). Other requested features include better analysis of output results, more but easier flexibility and graphical model building.

It is apparent that no single package could possibly incorporate all desirable features, being at same time very easy to learn and use, inexpensive, with excellent graphical facility, extensive flexibility and standard features, and intelligent features for experimental design and output analysis.

However, the features specified by survey participants could be a useful indicator of users' needs, which could be useful for software developers in order to understand better customers' requirements. This should lead to further improvement of simulation software and providing more flexibility achieved by less modelling efforts and time.

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SHORT NOTES

Supply Chain Management – The Paper Game

In co-operation with the Austrian Research Centers Seibersdorf (ARC) and KPMG Consulting GmbH a demonstration model for Supply Chain Management was developed. It follows a product from the raw material to the final user.

The primary goal was creating a model were different parameters could be changed during simulation to observe the effect on the whole chain

The Beer Game - the Predecessor

The general idea was inspired by the Beer Game, a role-playing simulation developed at MIT in the 1960's to clarify the advantages of taking an integrated approach to managing the supply chain; it particularly demonstrates the value of sharing information across the various supply chain components.
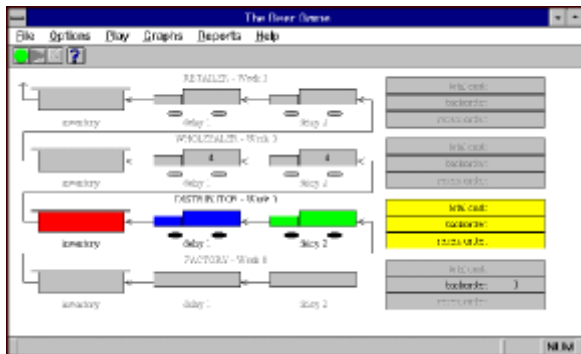

Fig.1 : The Beer Game

The Beer Game was developed at MIT's Sloan School of Management as part of Jay Forrester's research on industrial dynamics.

Descriptions and analysis of the game can be found in: Sterman, J.D. "Modeling Managerial Behavior: Misperceptions of Feedback in a Dynamic Decision Making Experiment" Management Science 35(1989) pp.321-339, or in Sterman, J.D. "Teaching Takes Off: Flight Simulators for Management Education" OR/MS Today Oct. 1992 pp.40-44.

The Paper Game

Consider a simplified supply chain, consisting of a single retailer, a single wholesaler which supplies the retailer, a single distributor which supplies the wholesaler, and a single factory supplied with unlimited raw

materials which makes the product and supplies the distributor.

Each component in the supply chain has limited storage capacity, and there is a supply lead time and order delay time between each component. Each component in the supply chain tries to meet the demand of the downstream component.

Any orders which cannot be met are recorded as backorders, and met as soon as possible.
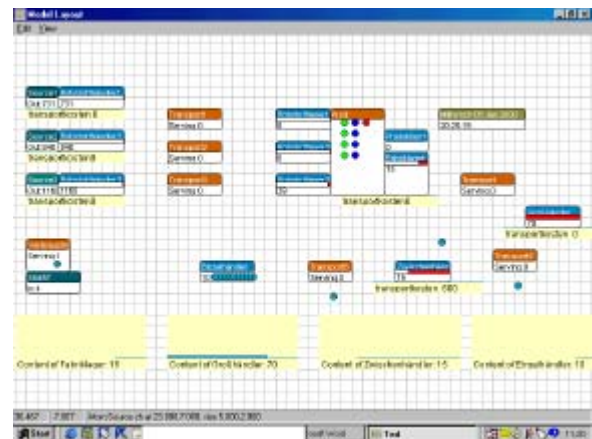
Fig. 2 : The Paper Game

Also, each supply chain member orders some amount from its upstream supplier. It takes some time for this order to arrive at the supplier. Once the order arrives, the supplier attempts to fill it with available inventory, and there is an additional transportation delay before the material being shipped by the supplier arrives at the customer who placed the order.

These delays as well as the ordering strategies are parameters which can be adjusted by the user. For each member of the supply chain one of five different ordering strategies has to be chosen:

- ordering a constant demand in choose able time steps
- ordering a constant demand as soon as a certain minimum content is reached
- ordering a demand to fill the storage to a certain maximum in choose able time steps
- ordering a demand to refill the storage to a certain maximum as soon as a certain minimum content is reached
- ordering as much as needed to meet the demand of the downstream component

These parameters can be adjusted in a dialog box opened by double clicking the atom (Fig.3). Other parameters to be given are the a supply lead time and order delay time.
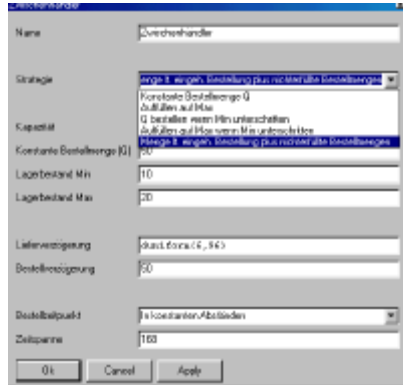
Fig.3 : Dialog box to adjust parameters

In the transport modules the way of transportation can be chosen as well as the distance between the ordering and the delivering member of the supply chain.

The factory has two strategies of production: either there is as much produced as necessary to fill the storage, or as much as ordered.

Of certain interest in this model are the influence that the different ordering strategies have on the whole chain. This can be watched through following parameters:

- Cost of transportation
- Cost of storage
- Profit
- Content of storages

Observing these parameters shows the typical behavior of a supply chain: changes to the parameters of one member effect after a certain time delay all other members, too.

Implementation, Availability

The implementation was done in Taylor ED, a simulator that offers a great amount of flexibility due to its 4d script. This allows to manipulate and if necessary even completely change the behavior of each atom.

Another important advantage is the possibility to send messages from each atom to any other within the system. This way the ordering could be easily simulated without the afford of using additional atoms.

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Age-structured Initiation Models for Illicit Drugs

Often models of drug initiation and drug use are based on the same principles as epidemiological models. At first sight it is not clear why drug use and infectious diseases have much in common. Initiation into consumption of an illicit drug is usually a deliberate decision of an individual, whereas the act of infection by a pathogenic agent (e.g., the common cold virus) usually takes place without the infected individual having any awareness of the process.

Nevertheless, drug use is clearly contagious in the sense that use by some individuals affects the probability that others will use through multiple mechanisms. In a very literal sense, most users are introduced to a drug by a friend or relative; the more drug users there are, the more likely an individual is to be offered the drug.

Looking at drug use and the process of initiation in more detail, it is clear that the decision of a non-user to start consumption depends strongly not only on the individual's immediate, personal social environment, but also on the overall reputation of a drug in society, e.g., as portrayed in movies or news media.

The additional insight considered and quantified in these new models are not only the age-specific initiation rate, but also that the influence of a drug user on a non-user vulnerable to initiation can depend on the ages of both individuals. A sixteen year old might look up to and seek to emulate an eighteen year old, but rebel and try to do exactly the opposite of what his or her parent's generation is perceived to be doing. So drug use by an 18 year old might encourage a 16 year old to initiate even though drug use by a 38 year old might discourage it. There are age-specific epidemiological models in the literature, but as mentioned above, the process of contagion is different for drug initiation.

A simple way to introduce age is to split the population into different age groups. This leads to so-called compartment models with a large number of population groups. A more general method is to include age as a second parameter in addition to time. So a continuous age distribution of the population can be fully taken into consideration. The analysis of the model becomes in some way easier, because there are fewer groups to consider, but in some sense also more complicated, because this method leads to a system of partial differential equations – a further development of the so-called McKendrick equation.

The equation system depends on the number of population groups taken into consideration. In the simplest case with two groups, namely non-users and users of the drug, and if we assume a fixed population size, one equation for the dynamics of the non-user population remains:

$$\frac{\partial}{\partial t}P(t,a) + \frac{\partial}{\partial a}P(t,a) = -\mu(t,a)P(t,a)$$

where $\mu(t,a)$ describes the actual initiation rate at time t of non-users aged a. But this initiation rate depends on 3 different factors:

1. a basic initiation rate, representing the chance of a non-user to start drug consumption without any influence from others.
2. a reputation factor, describing the influence of other people depending on their age and the age difference to the non-user.
3. a prevention term, incorporating the change of behavior due to prevention programs and campaigns

$$\mu(t,a) = \overline{\mu}(a)\Phi\big(R(t,a)\big)\Psi\big(w(t,a)\big)$$

4. Hence, the initiation rate is

with
$$R(t,a) = \int_0^\omega m(a,a')\left(1 - \frac{P(t,a')}{k}\right)da'$$

as reputation function of the drug. This $m(a,a')$-function describes the influence of drug users of age a' on a non-user of age a, it can be either positive or negative.

Depending on the choice of $m(a,a')$ the solution converges to a stable positive equilibrium, or it ends up in a limit cycle of repeating waves of drug epidemics. One of the main question concerning such models is: how to choose an optimal prevention program, i.e. when and in which age groups one should spend money for prevention in order to maximize the effects?

In literature there are only theoretical investigations on models with simpler feedback mechanisms, but they can be extended in such a way, that they can be applied in this case, too. Nevertheless, the resulting numerical problem is still very difficult to solve, especially if more population groups are taken into consideration.

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Modelling of Hybrid Systems by MLD

Modelling and simulation, as most usual way to analyse and design the control strategy are well developed for continuous and discrete time systems. But a lot of industrial processes have a hybrid nature, because of interactions between continuous and discrete components. There are several approaches for hybrid system modelling e.g. hybrid automaton, hybrid petri nets, etc. but each of them belongs to special class of hybrid systems.

Here a framework for modelling systems described by physical laws, logic rules and operating constrains, denoted as mixed logical dynamical (MLD) systems [1] is introduced. Such a MLD system is described by linear equations and inequalities involving continuous and integer variables and is capable to model linear hybrid systems, finite state machines, some classes of discrete event systems, constrained linear systems and non-linear systems which can be approximated by piecewise linear functions.

The interactions between physical laws, logical rules and operating constraints are transformed into linear dynamic equations subject to linear mixed-integer inequalities. If we adopt capital letters X_i to represent statements, e.g. "x<0", then X_i can have a *truth value* of either true (T) or false (F) (propositional calculus). Statements can be combined into compound statements by means of connectives: "$\wedge$" (and), "$\vee$" (or), etc. Correspondingly one can associate with X_i a logical variable $\delta_i \in \{0,1\}$, which has a value 1 if X_i = true or 0 otherwise. A propositional logic problem can be solved by means of linear integer program by suitably translating the original compound statements into linear inequalities involving logical variables δ_i, see Table 1.

Logic	Inequalities
$X_1 \vee X_2$	$\delta_1 + \delta_2 \geq 1$
$X_1 \wedge X_2$	$\delta_1 = 1 \; \delta_2 = 1$
$\neg X_1$	$\delta_1 = 0$
$X_1 \rightarrow X_2$	$\delta_1 - \delta_2 \leq 0$
$X_1 \leftrightarrow X_2$	$\delta_1 - \delta_2 = 0$
$X_1 \oplus X_2$	$\delta_1 + \delta_2 = 1$

Table 1: Basic conversion of logic relations into inequalities

Frequently one has to deal with products of logical variables, and of continuous and logical variables. To transform such products an auxiliary variables are needed. The product term of two logical variables $\delta_1\delta_2$
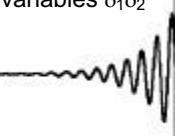
can be replaced by auxiliary logical variable $\delta_3 = \delta_1 \delta_2$, and the conversion into inequalities is

$$\delta_3 = \delta_1\delta_2 \text{ is equivalent to } \begin{cases} -\delta_1 + \delta_3 \le 0 \\ -\delta_2 + \delta_3 \le 0 \\ \delta_1 + \delta_2 - \delta_3 \le 1 \end{cases}$$

The product term between logical and continuous variable $\delta f(t)$ can be replaced by auxiliary real variable $z = \delta f(t)$, and the conversion into inequalities is

$$z = \delta f(t) \text{ is equivalent to } \begin{cases} z \le Md \\ z \ge m\delta \\ z \le f(t) - m(1-\delta) \\ z \ge f(t) - M(1-\delta) \end{cases}$$

where is M maximum and m minimum of $f(t)$.

Consider the following system:

$$x(t+1) = \begin{cases} 0.8x(t) + u(t) & \text{if } x(t) \le 0 \\ -0.8x(t) + u(t) & \text{if } x(t) > 0 \end{cases}$$

If previously described transformations are used, the following MLD system (inequalities are omitted due to the lack of space) is obtained:

$$x(t+1) = 1.6z(t) - 0.8x(t) + u(t)$$

By generalising the previous example the MLD form can be written as

$$x(t+1) = Ax(t) + B_1 u(t) + B_2 \delta(t) + B_3 z(t)$$
$$y(t) = Dx(t) + D_1 u(t) + D_2 \delta(t) + D_3 z(t)$$
$$E_2 \delta(t) + E_3 z(t) \le E_1 u(t) + E_4 x(t) + E_5$$

For more details see reference [1]. The transformation of a system described by physical laws, logical rules and operating constraints to MLD form is tedious and complex procedure. Therefore a language HYSDEL in which a hybrid system can be efficiently described in a compact way and automatically compiled into MLD form is under development [2].

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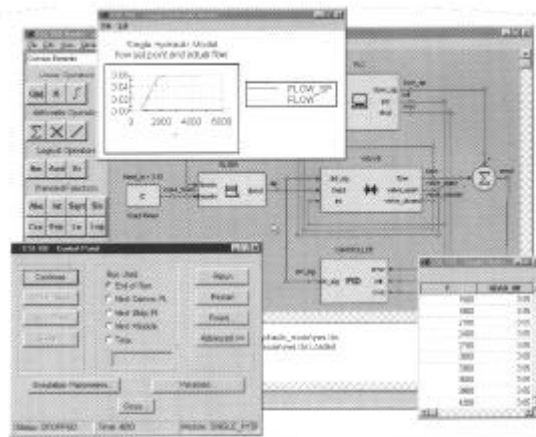*bostjan.potocnik@fe.uni-lj.si,*
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SHORT NOTES

SIMULATION CENTRES

SIMVIS

SIMVIS - Simulation and Visualisation - is a working group at Magdeburg University with the following aims: http://www.simvis.org

- Organisation of the annual international conference "Simulation and Visualisation" in March - info at http://www.simvis.org/tagung2001/
- Co-ordination of HLA - activities at University Magdeburg and dissemination of HLA information via http://isgsim1.cs.uni-magdeburg.de/hla/
- Initiative for a GPSS/SLX User Group
- Co-ordination of projects in modelling and simulation at University Magdeburg

Conference "Simulation and Visualisation"

Until the middle of the eighties simulation technique was been focused on the traditional number crunching. The scope has been enlarged with the ability of display hardware and visualisation and animation software. Users of simulation models started to look inside the black box of simulation. They required the graphical representation of simulated systems and processes.

The demands on visualisation have changed over the years. Animated black-and-white pictures on alpha-numeric terminals connected with mainframes dominated in the early days. A new milestone was the availability of PCs with simulation software offering simple 2D-animation.

The demands on visualisation and animation are still increasing. 3D-animations in movie quality are sales arguments for simulation services. Human acting in distributed virtual scenarios is one of the current front activities.

A conference on simulation and visualisation has been established for more than 10 years at the University of Magdeburg. The title of this conference has been changed over time but the main focus has always been on topics related to association of simulation and visualisation. Prof. Peter Lorenz from the University of Magdeburg was the initiator of this conference series.

In the last years the conference has been attended by a raising number of international speakers and guests. The conference has left the national frame and has been accepted by the international simulation community. The current conferences are organised by the Department of Simulation and Graphics at the University of Magdeburg together with the Fraunhofer Institute IFF at Magdeburg.

The Internet and the WWW support the access to simulation models and to visualisations in a manner which is independent of the location and the used hardware and software. Will there be a trend to move simulation and visualisation services into the Internet or intranets?

The High Level Architecture (HLA) has been established as an IEEE standard. This standard will allow distributed simulations to move into new application areas. In this context, new possibilities will arise to integrate non-simulation components, e.g. GIS and other information services, into complex simulation applications. How can the use of existing simulation models in HLA federations be facilitated?

Simulation, visualisation, and Virtual Reality are also central components of modern training systems. How should the interfaces between the components in such complex training systems be designed and will there be new requirements caused by the network-based distribution of the components?

Modelling and simulation are also integral parts of elementary and higher education in a variety of areas. Which methods and tools are available or can be developed to teach modelling and simulation techniques?

The ever growing amount of multi-dimensional input data and results in the modelling process requires new ways of presenting and exploiting these data. Can we use image analysis techniques for the construction and the evaluation of models?

Classic application areas of simulation and animation include manufacturing and logistics. Which devel-

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opments in these areas can be seen to emerge from the application of new simulation and visualisation techniques?

Simulation and Visualisation 2001

The next conference will be held from March 22nd until 23rd 2001 in Magdeburg. Main topic for this conference is the influence of new developments in the IT area on methods and tools for simulation and visualisation:

- Simulation and visualisation services in the WWW
- Simulation and visualisation in distributed training environments
- Simulation and visualisation as subject in education
- HLA-based modelling and distributed simulation
- Data-driven model generation and model identification
- Simulation and visualisation in manufacturing and logistics
- Image-based modelling and analysis techniques
- Geometric modelling for visualisation purposes

Furthermore, within the conference, the 3rd HLA - Forum will be organised. The workshop will take place on March 21, 2001 in Magdeburg prior to the annual Simulation and Visualisation conference.

The workshop provides a platform for discussion and exchange between experienced HLA users as well as other persons interested in HLA. All persons interested in the HLA topic are invited to participate actively in this workshop, e.g., by presenting their experience with the application of HLA or by presenting HLA related projects to the audience.

For detailed information see

http://WWW.SIMVIS.ORG/tagung2001/

The conference serves as a platform for experts from science and industry and gives a fresh impetus to the fields of research, development, and application.

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Interdisciplinary Research Group for Modeling and Simulation in Pharmacokinetics
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has been active since 1976. The initiators were late Prof. France Bremsk from Faculty of Electrical Engineering and Prof. Franc Kozjek from Faculty of Pharmacy. In 2000 the members of the group are Profs. Rihard Karba, Ales rhar and Stanislav Primozic and Assist. Aleš Belic and Iztok Grabnar.

In the frame of the research work of the group the attention is given to investigation of transport and bio-transformation of bioactive ligands in the systems of increasing complexity considering the diversity of structural and interfacial characteristics. It is the aim of the work to identify the parametrs that exert the influence on mechanism and kinetics of the processes.

This field is the object of theoretical and experimental studies which are conceptually gathered in the areas of basic and clinical pharmacokinetics. The knowledge of physical and biological parameters of barrier transitions enables the design of heterogeneous systems of the bioactive ligand-carrier type which represent the starting point for the development of controlled and targeting drug delivery systems used for regional and global treatment of various diseases. Quantitative relationship between physico-chemical parameters and parameters describing transport, stability and activity are studied by the aid of mathematical modeling and computer simulation considering kinetic and dynamic aspects. Basic knowledge obtained in above studies promotes the investigation of drug pharmacokinetics in various physiologic and pato-physiologic conditions of the organism.

The development of compartment, physiologic and hybrid pharmacokinetic models, which assume different mechanisms of transport, i.e. diffusion and convection, are achieved by the use of different modelling and simulation tools.

These include analogue and hybrid computers, area oriented tools WINNONLIN and ADAPT II and general tool MATLAB. Special attention is given also to the methods of artificial intelligence such as fuzzy logic, genetic algorithms, and artificial neural networks.

Combined pharmacokinetic-pharmacodynamic modeling is becoming the subject of increasing interest.

The group published more than 60 articles in international peer reviewed journals and more than 100 papers in the proceedings of international scientific conferences. The group received national science award for achievements in research in the area.

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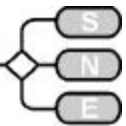
SIMULATIONISTS PERSONALITIES

This new SNE corner follows two aims: to introduce young simulationists, and to report about awards and personal events. In both cases a curriculum vitae gives inside into the carrier of the simulationist:

- A young researcher in the area of modelling and simulation will be introduced in this corner, if e.g. his Ph.D. thesis is outstanding, or if he has got research position, etc.
- Simulationists with high reputation often receive awards, or they are honoured in symposia, etc - these events will be reported here too.

This issue starts the new corner by introducing a young researcher (Ch. Almeder), by reporting about awards for J. Banks and B. Schmidt, and, sadly, about A. Pritsker in memoriam

Jerry Banks

Jerry Banks Receives 1999 INFORMS College on Simulation Distinguished Service Award

Dr. Jerry Banks, Senior Simulation Technology Advisor at AutoSimulations, Inc., and who retired in 1999 from his position as Professor in Georgia Tech's School of Industrial and Systems Engineering, was presented the 1999 Distinguished Service Award of the INFORMS College on Simulation during the College's bus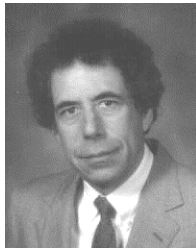iness meeting at the 1999 Winter Simulation Conference in Phoenix. The award, first given in 1986, recognizes each year at most one individual who has "... provided long-standing, exceptional service to the simulation community... sustained over a period of 15 to 20 years or longer and [has been] acquitted with distinction." The selection committee was chaired by Bruce Schmeiser (Purdue University) serving in his second year on the Committee, with the other members' being Thomas J. Schriber (The University of Michigan) serving his third and final year, and W. David Kelton (University of Cincinnati) serving his first year.

Dating back to as early as 1965 when he began his faculty career in Georgia Tech, Dr. Banks has been (quoting from the nomination letter) "... an avid spokesperson for simulation -- an ambassador for our industry," and has consistently "... been a vocal advocate both nationally and internationally" for simulation. In addition to the professional-service activities re-

counted in part below, he has lectured over an extensive geographic area on behalf of the power and appropriate use of simulation, including numerous trips to Japan, Mexico, Canada, France, Belgium, Germany, Austria, Italy, Puerto Rico, Chile, Brazil, Singapore, China, and Turkey.

Jerry's work on behalf of the Winter Simulation Conference, in many different roles, is second to none. He served as Arrangements Chair in 1981, Associate General Chair in 1982, General Chair in 1983, and as the Institute of Industrial Engineers (IIE) Representative to the WSC Board of Directors over a nine-year period from 1984 through 1992 during which time he was Board Liaison in 1987, Board Vice Chair for 1987-1989, and Board Chair for 1989-1991. It was during these years that the WSC developed into the major success (and major effort) to which we have been accustomed, and Jerry's steady hand in guiding the conference played a critical role in moving it into its current position of being the preeminent simulation conference in the world. As General Chair for WSC'83 he instituted many changes that are now recognized as marking that year's conference as a major turning point.

In addition to his conference-organization service for the WSC, Jerry has also played key roles in the national conferences of the Operations Research Society of America (ORSA, one of the forerunners of INFORMS) in which simulation played a major role, including being General Chair of the Fall National Meeting in 1977 in Atlanta. Jerry also served ORSA by being on the Student Affairs, Education, and Social Sciences Applications Committees. He was an ORSA visiting lecturer from 1969 to 1977, and has been a member of ORSA and INFORMS since 1965.

Outside INFORMS, Dr. Banks has also served in many roles in other professional societies, usually championing simulation, including IIE, the Society for Computer Simulation (SCS), the Society of Manufacturing Engineers (SME), and the American Society for Quality Control (ASQC). Most recently, Jerry's regular "Simulation" editorial columns in *IIE Solutions* have become a mainstay of that publication, and have attracted considerable attention due to their insight and thought-provoking nature.

Less widely known, though still important if only in a behind-the-scenes setting, are Jerry's extensive activities in refereeing papers for journals, as well as having served as an Associate Editor for *IIE Transactions*. And internally at Georgia Tech, Jerry worked hard on simulation curriculum development and stu-

dent advising, leading to Tech's becoming the international leader for simulation research and education that we know today.

So it is with great pleasure (and thanks) that the INFORMS College on Simulation presents its 1999 Distinguished Service Award to Dr. Jerry Banks.

Our community is indeed fortunate to have such a tireless champion of our profession working for us for these many years. He can be reached at

jerry_banks@autosim.com.

For the Call for Nominations for the 2000 Award, please visit http://www.informs-cs.org/dsaward.html. A listing of past winners of the Award may be found at http://www.informs-cs.org/dsawin.html.

Christian Almeder

Christian Almeder was born in 1973 in Vienna, Austria. He attended a science-oriented school with a humanistic basis. Afterwards he started the study of Mathematical Computer Sciences at the Vienna University of Technology.

During the second year of his study he started to take part in numerous project, mostly in the field of computer numeric. One of the main aspects of his work at this time was the discrete Fourier transformation and solution methods for large linear sparse systems. In the sequel he proceed to the field of modelling in simulation. Besides lectures about the fundamentals he concentrated on physiological models on the one hand and epidemiology on the other hand.

In 1996 he started the work on his diploma thesis as part of a cooperation project between the Institute of Analysis and Technical Mathematics (Prof. Felix Breitenecker, Vienna University of Technology) and the Austrian Research Centres Seibersdorf (ARCS) about the modelling and simulation of the human blood circulation. As part of larger research team he improved and revised a stationary model of the arterial blood flow within a vascular network, and designed a time and memory optimised program which forms the core of a software package for the clinical use.

As a logical continuation of his diploma thesis he pursued the cooperation with the Austrian Research Centres Seibersdorf and Prof. Felix Breitenecker as supervisor in a doctoral thesis on the dynamics of the blood flow within an arterial network and the propagation of the pulse waves. He tried to develop a model, that on the one hand is detailed enough to ensure an accurate approximation of the processes going on in the human body, and on the other hand to keep it as small as necessary to make network simulation and global analysis possible. He presented his diploma and his doctoral thesis at numerous simulation and biomedical engineering congresses in Europe and US with great success.

In December 1999 he passed his final examination with distinction. As he also passed all exams before with distinction (since the age of 15!), he was awarded with a *promotio sub auspiciis praesidentis rei publicae*.

This academic ceremony took place in October 2000 in the Ceremony Hall of Vienna University of Technology: In the *laudatio* Felix Breitenecker introduced Christian Almeder to the president of the Austrian Republic, Dr. Thomas Klestil (see picture above). The president honoured Christian Almeder's scientific carrier in his speech and awarded the ring of honour to Christian Almeder (coupled with a young-researchers price), see picture below.

SIMULATIONISTS

It should be noted, that such an award is given to maximal one young scientist in two years. In former times the scientist got automatically the position of a research assistant.

In March 2000 Christian Almeder started in a new project concerning age-specific population models describing the initiation of illicit drug. But he works not only on descriptive models, but also on optimisation strategies for prevention and treatment programs. But also with these new models, that he works on now, he sticks to the same basics, namely the numerical analysis and solution of partial differential equations.

Besides all this work he gives lectures and tutorials at the Vienna University of Technology and wrote several book reviews and comparison solutions for the SNE, mostly concerning the use of Computer Algebra Systems (CAEs) in modelling and simulation.

Christian Almeder became ASIM member in 1998, he already attended as well ASIM conferences as well as international simulation conferences.

At the present he works as research assistant at the Department of Operations Research and Systems Theory (Vienna University of Technology) in the field of age-structured population models.

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In Memoriam A. Alan B. Pritsker (1933–2000)

Alan Pritsker, one of the founders of the field of computer simulation, passed away on August 24, 2000. Over the course of his forty-five year career, Alan made seminal contributions to many areas of the field of simulation and to the larger fields of industrial engineering and operations research. Comprehensive documentation of Alan's career can be found in his professional autobiography Papers, Experiences, Perspectives (Systems Publishing Corporation 1990). Moreover, in March 2001 an article entitled "Alan Pritsker's Multifaceted Career: Theory, Practice, Education, Entrepreneurship, and Service" will appear in a special issue of IIE Transactions honouring Alan for his numerous contributions to our profession over the past five decades.

Foremost among Alan's achievements is his work in the theory and methodology of discrete and combined discrete-continuous system simulation. During the early 1970s, Alan and his students formulated the basic principles of combined discrete-continuous simulation and implemented those principles in the GASP IV, SAINT, and SMOOTH simulation languages. Subsequently Alan extended the foundations of combined simulation to encompass the process-interaction approach; and working with several collaborators, he implemented a family of simulation software systems, including SLAM and its extensions - SLAM II, TESS, SLAMSYSTEM, FACTOR/AIM, and Visual SLAM/AweSim. Alan's strategic vision of a family of related simulation software products played a crucial role in the growth and maturing of the field of simulation over the past thirty years.

Alan also made numerous fundamental contributions to the theory and methodology for analysis of stochastic networks and more general large-scale simulation experiments. For this work he received the "H. B. Maynard Innovative Achievement in Industrial Engineering Award" from the American Institute of Industrial Engineers (AIIE, now IIE) in 1978 and the "Outstanding Simulation Publication Award" from The Institute of Management Sciences (TIMS, now INFORMS) College on Simulation and Gaming (now the College on Simulation) in 1985.

Among Alan's diverse contributions to engineering practice, perhaps the most prominent was his development and use of large-scale simulation models to support policy analysis for organ transplantation by the United Network for Organ Sharing. In particular, Alan's work was used to formulate more effective and equitable protocols for assigning liver transplants to waiting patients. This is a remarkable example of the definitive practice of system simulation in addressing ultimate questions of life and death.

Alan's first love was teaching, including not only undergraduate- and graduate-level university courses but also professional short courses. Alan served on the faculties of Arizona State University (1962–69), Virginia Polytechnic Institute and State University (1969–70), and Purdue University (1970–98). From 1970 to 1973, Alan served as Director of the Center for Large-Scale Systems at Purdue University. During the 1970s and 1980s, Alan's activities at Purdue led to what many have called the "Golden Age of Simulation." He received honorary doctorates from Arizona State University (1992) and Purdue University (1998).

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Most of Alan's groundbreaking contributions to engineering theory, methodology, and practice are widely available via numerous well-known texts and book chapters that he wrote over the past forty-five years. Perhaps more than any other single individual, Alan effectively disseminated knowledge about simulation technology at all levels of academia, government, and industry through the publication of twelve popular textbooks.

In addition to educating many undergraduate-level students in hundreds of traditional academic courses and industrial short courses on simulation, Alan compiled a superlative record as an adviser of graduate students. Of the eighteen doctoral students and over sixty master's students who completed their graduate work under Alan's supervision, all are highly successful professionals in academia, government, or industry.

Another prominent aspect of Alan's contributions to the growth of the field of simulation was his role in founding and leading several commercial enterprises dedicated to the development and dissemination of simulation technology. He was a cofounder of Pritsker & Associates, Inc. (1973). He also served as the Board Chair of FACTROL, Inc. (1986–89). When Pritsker Corporation was created in 1989 through the merger of Pritsker & Associates and FACTROL, Alan served the new company as Board Chair and CEO (1989–91; 1996–98) and as President and CEO (1991–96). In 1987 Alan received the "Arthur Young–VENTURE Magazine Entrepreneur of the Year Award."

Alan's service to the profession spanned a broad range of activities sustained over the past four decades. Perhaps Alan's most prominent contributions in service were made through his leadership of the Winter Simulation Conference (WSC). He served as a member of the WSC Board of Directors representing AIIE from 1970 to 1973. He also served on the WSC Board of Directors representing TIMS–College on Simulation and Gaming from 1981 to 1987; and he served as Board Chair from 1984 to 1985. Alan was an active participant in the technical program of the WSC each year for over thirty years, and in 1989 he delivered the keynote address for that conference.

SIMULATIONISTS

SIMULATIONISTS

By his leadership in various professional societies and governmental organizations over the past forty-five years, Alan contributed significantly to the dramatic growth of the field of simulation as well as the larger fields of industrial engineering and operations research. He cofounded the Operations Research Division of AIIE in 1968, and he served as the director of that division from 1968 to 1970. He also cooriginated the AIIE Systems Engineering Conference in 1973.

He received the "AIIE Distinguished Research Award" in 1966, and he was elected a Fellow of AIIE in 1978. It is especially noteworthy that in 1991, Alan received from IIE the "Frank and Lillian Gilbreth Industrial Engineering Award," the highest and most esteemed honor presented by that organization.

Alan's service to professional societies was not limited to IIE. >From 1973 to 1979, he served the Society for Computer Simulation as the area editor for combined discrete-continuous simulation of the journal SIMULATION.

For his long-standing, exceptional service to the international simulation community, Alan received the "Distinguished Service Award" from the INFORMS–College on Simulation in 1991. Moreover, in 1999 Alan received the "Lifetime Professional Achievement Award" from the INFORMS–College on Simulation, which is the highest honor given by that society.

Elected to the National Academy of Engineering in 1985, Alan enjoyed the distinction of being the second industrial engineer to join that organization. Over the past fifteen years, Alan actively served the National Academy of Engineering in many positions of great responsibility.

We are indeed fortunate to have benefited from Alan Pritsker's multifaceted contributions to our profession over the past five decades. A common theme running through almost all discussions about Alan is the extraordinary effect that he had on every person whose life he touched, however briefly. He will be sorely missed by his family, friends, and colleagues. Alan is survived by his wife, Anne; his children, Pam, Caryl, Ken, and Jeff; and five grandchildren.

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Bernd Schmidt

A Famous Simulationist Became 60

In April this year Prof. Dr. Bernd Schmidt celebrated his 60th birthday. It was the day before the Workshop "Agent Based Simulation 2000". There was quite a large number of well known Scientists from all over the world. Nearly all past and present students were also present.

A special mark of distinction was a colloquium which was held in the morning. The topics covered a wide spectrum and gave rise to many intensive discussions. In the morning his former students presented a publication in honour of Professor Schmidt, a book entitled "Gedanken zur Zeit".

SCS (Society for Simulation and Modeling International) awarded him with the "Outstanding Service Award" for his contributions to the Society - the laudation given by Francois Cellier.

ASIM – the German Simulation Society awarded him ASIM's highest laurel: Bernd Schmidt became honorary member of ASIM. Felix Breitenecker, ASIM President, handed over the honorary member document personally, see photo.

In this manner the special merits in simulation should be awarded which Professor Schmidt deserved well. Professor Schmidt is a founder member of ASIM and was the first speaker of the Society.

In the afternoon and the evening his former students took over and entertained the guests with many amusing contributions, proving that humor and high-spirits are compatible with scientific achievement.The party ended with an elegant dinner, which will be remembered by all guests for a long time.

Experto credite! Ad multos annos, Bernd Schmidt !

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EUROSIM SOCIETIES

EUROSIM, the Federation of European Simulation Societies, was set up in 1989. The purpose of EUROSIM is to provide a European forum for regional and national simulation societies to promote the advancement of modelling and simulation in industry, research, and development. EUROSIM members may be regional and/or national simulation societies. Full membership and observer membership are available.

At present EUROSIM has ten full members and three observer members: ASIM – Arbeitsgemeinschaft Simulation (Austria, Germany, Switzerland), CROSSIM – Croatian Society for Simulation Modelling (Croatia), CSSS – Czech & Slovak Simulation Society (Czech Republic, Slovak Republic), DBSS – Dutch Benelux Simulation Society (Belgium, The Netherlands), FRANCOSIM – Société Francophone de Simulation (Belgium, France), HSS – Hungarian Simulation Society (Hungary), ISCS – Italian Society for Computer Simulation (Italy), SIMS – Simulation Society of Scandinavia (Denmark, Finland, Norway, Sweden), SLOSIM – Slovenian Simulation Society (Slovenia), UKSIM – United Kingdom Simulation Society (U.K.). AES – Asociación Española de Simulación (Spain), PSCS – Polish Society for Computer Simulation (Poland) and ROMSIM (Romanian Society for Modelling and Simulation) are observer members.

The EUROSIM Congress is arranged every three years in Europe. The 4th EUROSIM congress will take place in Delft, The Netherlands, June 26-29, 2001.

EUROSIM is governed by a Board consisting of one representative of each member society, plus the organizer of the last EUROSIM Congress (past president) and the organizer of the coming EUROSIM Congress (president).

At the EUROSIM'98 Congress the Board elected new officers for a three years period beginning on July 1, 1998: L. Dekker (DBSS) – president, K. Juslin (SIMS) – past president, A. Javor (HSS) – secretary, Y. Hamam (FRANCOSIM) – treasurer.

EUROSIM societies are offered to distribute to their members the news journal Simulation News Europe (SNE) as official membership journal:

http://www.argesim.org/sne

Furthermore members can subscribe the scientific journal Simulation Practice and Theory (SIMPRA) at a significantly reduced price:

http://www.elsevier.nl/locate/simpra/

Information may be found at the EUROSIM WWW Server:

http://www.eurosim.org/

ASIM

ASIM (Arbeitsgemeinschaft Simulation) is the association for simulation in the German speaking area. ASIM was founded in 1981 and has now about 700 individual members, and 20 institutional or industrial members.

In Memoriam – Björn A. Gottwald

22. September 1937 (Berlin) – 22. Juni 2000 (Freiburg)

Prof. Dr. Björn A. Gottwald, one of the very first members of ASIM and former speaker and co-speaker of the ASIM working group FG 4.5 Simulation in Medicine, Biology and Ecology, died by an accident during gardening. We were shocked by the news that we have lost one of our teachers in modelling and simulation in medicine and biology, a mentor, co-worker and friend. He had an outstanding professional career in research and pedagogical sense. But still he was primarily very generous, kind, considerate and tolerant person who crucially influenced the life of several friends, colleagues and students. Björn A. Gottwald was elected from the ASIM Board of Directors as honory member of ASIM in 1998.

We all feel with his family the loss of a precious person.

News from the ASIM board

The ASIM board met at the evening before the ASIM 2000 conference for a short discussion at „Hotel Hafen Hamburg".

First Prof. Breitenecker, ASIM president, reported on the re-organisation of the working groups and on the status of the publications (new folders available).

The board welcomed Prof. Ulf Müller of University Paderborn as new member. Prof. Müller was elected at Braunlage as new speaker of the working group „Simulation in der Betriebswirtschaft".

EUROSIM SOCIETIES

Main discussion points were: ASIM 2000, conferences to come, the activities of the working groups, ASIM publications and some organisational issues.

Furthermore it was decided to install awards for i) personal services in ASIM, ii) personal services in simulation, and iii) industrial or institutional services in simulation.

With respect to international simulation conferences, the board underlined again, i) that the competition of too many simulation conferences around the EUROSIM congress 2001 in June 2000 is contraproductive, and ii) that the EUROSIM congress should be scheduled in September (as from 1993 - 1995) in order to have more ASIM participants (in June there are no university holidays, furthermore end of June / begin of July exams are scheduled).

The board will meet again on December 1st. Please contact a member of the board, if the board should discuss a special topic.

Co-operation ASIM – UKSIM

ASIM and UKSIM have decided to improve their co-operation in the European area and to set up a price for young researchers in simulation technique.

ASIM und UKSIM will draw their attention onto a better schedule for simulation conference in Europe and will try to get (significant) reduction of conference fees, especially for young researchers.

It is planned to have this action first at the ESM'2001 in Prague (other conference organisers will be contacted). This action will be open also for other European simulation societies.

A young researchers price will be awarded for new methods in, or applications of simulation technique. Yearly the best contribution of a young researcher will be presented alternatively at the annual ASIM conference or at the UKSIM conference, or at an international conference related to one of these conferences. The price was drawn first time in 2000, on the occasion of the ASIM conference ASIM-2000 (jointly with the ESS'2000) in Hamburg.

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Re-organisation of working groups

Due to the development in research and technology, the two working groups „Simulationssoft- und -hardware" and „Simulation paralleler Prozesse" joined to a new group „Methods and Modeling in Simulation" (GMSS).

This working group shall supply a solid basis of methodological background and information on new directions in simulation for all application oriented working groups.

The group will strongly co-operate with all other groups. The first meeting will be a joint meeting with the group „Simulation Technischer Systeme" on March 5th and 6th 2001 in Dresden.

The speaker of the working group, Dr. Peter Schwarz gained four co-speakers to reach the ambitious goal to cover the broad research and interest area.

ASIM - Buchreihen / ASIM Book Series

Reihe Fortschritte in der Simulationstechnik / Series Frontiers in Simulation

kürzlich erschienen / appeared recently:

- G. Hohmann (Hrsg.): *13. Symposium Simulationstechnik*, Weimar, Sept. 1999
- D. P. F. Möller (Hrsg.): *14. Symposium Simulationstechnik*, Hamburg, Sept. 2000
- H: Szczerbicka, T. Uthmann (Hrsg): *Modellierung, Simulation und Künstliche Intelligenz*
- S. Wenzel (Hrsg.): *Referenzmodelle für die Simulation in Produktion und Logistik*
- I. Bausch-Gall (Hrsg.): *Simulation technischer Systeme – Stand und Entwicklungen*
- F. Breitenecker, D. Möller, P. Schwarz (eds): *New Developments in Simulation Technique* (to appear 19/2000)

Schwerpunkte / Topics:

- Statusberichte über Simulation in den ASIM Fachgruppen / Status reports
- Allgemeine Monographien / General monographies
- Proceedings der ASIM Tagungen / Proceedings of the ASIM conferences

Reihe Fortschrittsberichte Simulation / ARGESIM Reports Series Advances in Simulation

kürzlich erschienen / appeared recently:

- S. Pawletta: Erweiterung eines wissenschaftlich-technischen Berechnungs- und Visualisierungssystems zu einer Entwicklungsumgebung für parallele Applikationen
- Ch. Almeder: Hydrodynamic Modelling and Simulation of the Human Arterial Bloodflow
- Th. Preiß: Relationale Datenbanksysteme als Basis für Modellbildung und Simulation von kontinuierlichen Prozessen
- M. Lingl: Hybrid Modelling Approach in Discrete, Continuous and Combined Simulation (to appear 10/2000)

Schwerpunkte / Topics:

- Spezielle Monographien (Dissertationen, ...) / Special monographies (PhD-thesis, ...)
- Erweiterte Berichte der ASIM Fachgruppentreffen / ASIM Workshop proceedings
- Handbücher für Simulationssprachen / User Guides for simulation languages

Preis / Price: DM 40.- (ASIM-Mitglieder DM 30.-) + Versandkosten
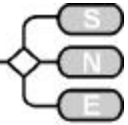
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or online - Email: info@asim-gi.org - www.asim-gi.org/publikationen

or via SCS European Publishing House: http://hobbes.rug.ac.be/~scs/pub

EUROSIM SOCIETIES

Publications

ASIM co-operates with SCS Europe and with ARGESIM (TU Vienna) in publication of two book series:

- ASIM/SCS book series „Fortschritte in der Simulationstechnik – Frontiers in Simulation"
- ASIM / ARGESIM / SCS book series „Fortschritts-berichte Simulation – Advances in Simulation"

Furthermore, the ASIM working groups report in so-called "ASIM Mitteilungen" about their meetings, about special developments, etc - either as ASIM self-publication or as publication is series of other publishers (e.g. ARGESIM Reports).

ASIM/SCS book series „Fortschritte in der Simulationstechnik – Frontiers in Simulation"

In April 2000 the new book „Referenzmodelle für die Simulation in Produktion und Logistik" has been published (editor: Sigrid Wenzel). In this multi-expert compendium a survey is given on common „reference models" in various fields of application, processes an structures. The authors are members of a reference model working group within ASIM. ISBN 1-56555-182-6, 281 p., 45 Euro (ASIM/SCS members), 90 Euro (others) + mailing.

In December 1999 the book on „Modellierung, Simulation und Künstliche Intelligenz" has been published (editors: Helena Szczerbicka, Thomas Uthmann). This state of the art synopsis covers a broad range of concepts and research activities in the field of AI and Simulation. ISBN 1-56555-128-1, 471 p., 58 Euro (ASIM/SCS members), 116 Euro (others) + mailing.

Also available in these series are the Proceedings of the annual ASIM conferences:

Proceedings of „Simulationstechnik – 13. Symposium in Weimar", Sept.1999 (editor: Georg Hohmann). ISBN 1-56555-130-3, 476 p., 60 Euro (ASIM/SCS members), 120 Euro (others) + mailing.

Proceedings "Simulationstechnik – 14. Symposium in Hamburg September 2000" (editor Dietmar P. F. Möller, ISBN: 1-56555-189-3, 560 p, 60 Euro (ASIM/SCS members), 120 Euro (others) + mailing

In preparation are two books. First, ASIM's working group „Simulation Technischer Systeme" does final editing on a volume on state-of-the-art and developments in this application area; the book „Simulation technischer Systeme – Stand und Entwicklungen" will be available in winter. Second, the new working group

„Grundlagen und Methoden in Modellbildung und Simulation" works on a volume on new developments in simulation methodology, in modelling and simulation technique, and algorithms. Highlights will be set on bond graph modelling, virtual reality, co-simulation, inverse simulation, formal models and qualitative models.

All books may be ordered from ASIM (Ingrid Bausch-Gall, Munich, Tel.: +49-89-3232625, Fax: +49-89-3231063) as well as from SCS Europe Publishing House (Rainer Rimane, Erlangen, Tel./Fax: +49-9131-66247), or via email (admin@asim-gi.org, rimane@informatik.uni-erlangen.de) or online via: http://www.asim-gi.org/publikationen/, http://hobbes.rug.ac.be/~scs/

ASIM / ARGESIM / SCS series Fortschritts-berichte Simulation - Advances in Simulation

This series is open for publication of PhD theses, habilitations, software guides, etc.

While the series „Advances in Simulation" is similar to „Frontiers in Simulation" with respect to layout and printing, the series „Fortschrittsberichte Simulation" is a low-cost series with special offers for bulks.

New books are available in this series:

- S. Pawletta: Erweiterung eines wissenschaftlich-technischen Berechnungs- und Visualisierungs-systems zu einer Entwicklungsumgebung für parallele Applikationen, ISBN 3-901608-57-5
- Ch. Almeder: Hydrodynamic Modelling and Simulation of the Human Arterial Bloodflow; ISBN 3-901608-58-3
- Th. Preiß: Relationale Datenbanksysteme als Basis für Modellbildung und Simulation von kontinuierlichen Prozessen, ISBN 3-901608-59-1

All these books may be ordered from ASIM (see above).

Reports from the working groups

Working Group "Simulation Technischer Systeme" (STS) met end of February in Esslingen (near Stuttgart). Due to the location, many of the 134 participants came from automotive industry. Many young engineers visited this interesting meeting. Parallel sessions covered several different areas of this working group.

Working Group "Simulation in Produktion und Logistik" (SPL) held a two-day conference with more than 180 participants in Berlin. Four parallel session with over 50 presentations gave many chances for

information and discussions. Conference proceedings (in German) can be obtained from the speaker Dr. Sigrid Wenzel. The following picture shows the organisers, Mr. Gora, Mrs. Wenzel and Mr. Rabe. A detailed report can be found in ASIM Nachrichten 3/2000.

Working Group "Simulation in der Betriebswirtschaft" (SBW) hold their traditional three-day - conference in Braunlage, Harz. About 40 participants discussed intensely applications, new trends and modelling aspects. A detailed report can be found in ASIM Nachrichten 3/2000.Conference proceedings can be obtained from: Prof. Dr. J. Biethahn, Institut für Wirtschaftsinformatik, Georg-August-Universität Göttingen, Platz der Göttinger Sieben 5, 37073 Göttingen, Tel: +49-551 394440, Fax +49-551 399679.

Working Group „Simulation in Umweltanwendungen" (SUAW) met on March 12th - 14th in Hamburg. Traditionally this meeting allowed much time for discussion of the more than 30 presentations. The papers were very interesting and their discussion was well accepted. 15 Min. discussion time for each paper seemed not to be enough time.

Working group "Simulation in Medizin, Biologie und Ökologie" (SMBO) organised, in cooperation with the GMDS working group "Mathematische Modelle in der Medizin" again the socalled „Ebernburger Gespräche", which took place from April 6 to April 8, organised by Prof. Dr.-Ing. Dietmar P. F. Möller. About 50 specialists of simulation in medicine, biology and ecology. exchanged their experiences in seven sessions. The first day of the symposium is traditional openend by a get together coffee with home made cake. The evening of the first day a wine taste was organised, and the evening of the second day closed by a candle light dinner in the cellar of the castle. The Proceedings of the symposium will be published by the SCS European Publishing.

Working Group "Grundlagen und Methoden in Modellbildung und Simulation" (GMSS) met already in begin of February (report see last SNE). Most working groups will meet again in spring next year. Detailed

information about the activities of the working groups in German is found in ASIM-Mitteilungen" which can be obtained from Prof. F. Breitenecker or Dr. Ingrid Bausch-Gall.

Please contact the speaker of a specific working group, if you are interested in their work:

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Albert-Einstein-Str. 21, D-18059 Rostock,
Tel.: +49-381-4983368,
Fax.: +49-381-4983426,
Email: wittmann@informatik.uni-rostock.de
http://www.asim-gi/sug

SKI Simulation und künstliche Intelligenz (Simulation and Artificial Intelligence)
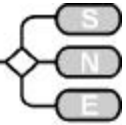*Prof. Dr.-Ing. Helena Szczerbicka,*
Univ. Hannover, Universität Hannover,
Inst. f. Informatik A,
Welfengarten 1 D 30167 Hannover,
Tel: +49-511-762-5184, Fax: -3675,
Email: hsz@informatik.uni-hannover.de
http://www.asim-gi.org/ski

FG Simulation in Medizin, Biologie und Ökologie (Simulation in Medicine, Biology and Ecology) Prof. Dr. Dietmar Möller, Universität Hamburg, FB Informatik, Techn. Informatiksysteme
Vogt-Köln-Str. 30, 22527 Hamburg
Tel.: +49-40-5494-2438,
Fax: +49-40-5494-2206,
Dietmar.Moeller@informatik.uni-hamburg.de
http://www.asim-gi.org/smbo

STS Simulation Technischer Systeme (Simulation of Technical Systems) Ewald Hessel, Hella KG Hueck&Co., Abt. EL-R, Werk II, Beckumer Straße, D-59552 Lippstadt
Tel: +49-2941-388572,
Fax: +49-2941-388427,
Email: ewald.hessel@hella.de
http:// www.sts.asim-gi.org

*SPL Simulation in Produktion und Logistik
(Simulation in Production and Logistics)
Dr. Sigrid Wenzel, Fraunhofer Institute for
Materialflow and Logistics, Joseph-von-
Fraunhofer-Str. 2-4, 44227 Dortmund
Tel. +49-231-9743-237,
Fax: +49-231-9743-234,
Email: wenzel@iml.fhg.de
http://www.asim-gi.org/spl*

*SBW Simulation in der Betriebswirtschaft
(Simulation in OR)
Prof. Dr. Ulf Müller, Univ. Paderborn,
Abt. Soest, FB 12,
Lübecker Ring 2,D-59494 Soest;
Tel: +49-2921-3783-00,
Fax: +49-2921-3783-01;
Email: mueller@sun1.uni-paderborn.de
http://www.asim-gi.org/sbw*

*FG Simulation von Verkehrssystemen
(Simulation of Transport Systems)
Prof. Dr. Ulrich Brannolte,
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Marienstr. 13, D-99421 Weimar
Tel. +49-3643-58-4470 Fax: -4475,
Email: Ulrich.Brannolte@bauing.uni-weimar.de
http://www.asim-gi.org/svs*

ASIM meeting and conferences to come

- **5.3. – 6.3. 2001 ASIM GMMS/STS 2001** *Modellie-rung und Simulation Technischer Systeme – Anwendungen*, Grundlagen, Methoden**;** FG GMMS und FG STS**;** Dresden, Info: E. Hessel, P. Schwarz
- **22.3. – 23.3.** *2001 SIMVIS 2001 Simulation und Visualisierung 2001;* SIMVIS Univ. Magdeburg, ASIM co-sponsor; Magdeburg, Germany Info: organisation@tagung.simvis.org
- **25.3. – 27.3. 2001** *ASIM SKI/SUG Simulation in Umwelt- und Geowissenschaften – Simulation und Künstliche Intelligenz***;** GMMS und FG**;** Münster, Info: H. Szerbiczka, J. Wittmann
- **2.4. – 4.5. 2001** *Workshop Agent Based Simulation***,** Univ. Passau - SCS Europe, ASIM co-sponsor, Passau, Info: B. Schmidt, http://www.or.uni-passau.de/workshop2000/
- **7.6. – 9.6. 2001** *ESM 2001, European Simulation Multiconference,* SCS Europe**,** ASIM co-sponsor**,** Prag; Info: http://hobbes.rug.ac.be/~scs/
- **26.6. – 29.6. 2001** *EUROSIM'2001 EUROSIM's Simulation Congress*; EUROSIM, ASIM co-organiser*;* Delft: Information: http://www.ta.twi.dudelft.nl/PA/EUROSIM2001

- **11.9. – 14.9. 2001** *ASIM 2001 15. Symposium Simulationstechnik,* Paderborn. Information: F. Dörrscheidt,
- **11.3. – 13.3. 2002** *ASIM SBW 2002 18. Symposium "Simulation als betriebliche Entscheidungshilfe",* Braunlage, Harz. Information: U. Müller
- **März 2002** *ASIM SPL 2002 10. ASIM-Fachtagung "Simulation in Produktion und Logistik"*
- **September 2002** *ASIM 2002 16. Symposium Simulationstechnik,* Rostock.

ASIM 2000 - Report

The 14th ASIM conference on Simulation Techniques took place in Hamburg from 25 to 28 of September 2000. The ASIM 2000 was the first ASIM/SCS Joint Conference, announced as ASIM/ESS 2000 Joint Conference on Simulation.

The ASIM 2000 was organised by the Institute of Computer Engineering, Faculty of Computer Science, University of Hamburg. Chairman of the ASIM 2000 Conference was Prof. Dr.-Ing. Dietmar P. F. Möller. A detailed report on ASIM'2000 can be found elsewhere in this SNE issue.

As the ESS'2000 started at the last day of ASIM'2000, there was an overlap of both conferences, and participants could attend two conferences. ASIM was as well during ASIM'2000 as well as during ESS'2000 represented by the ASIM Office (picture below, ASIM - Team from ARGESIM TU Vienna). There, participants the new ASIM / SCS publications were offered and participants could use internet resources.


An evaluation of the combination of the conferences is going on: there were some advantages (e.g. the ASIM office could welcome new members during ESS'2000), but also some disadvantages especially during preparation.

ASIM 2001 - Second announcement and Call for Papers

ASIM 2001 will take place from September 11-14 at the University of Paderborn. Chair of the organizing committee is Prof. Dr.-Ing. Frank Dörrscheidt (department of control engineering).

All aspects of modelling and simulation will be addressed:

- Modelling and Simulation Methods,
- Simulation Hardware and Software, Simulation Tools
- Applications
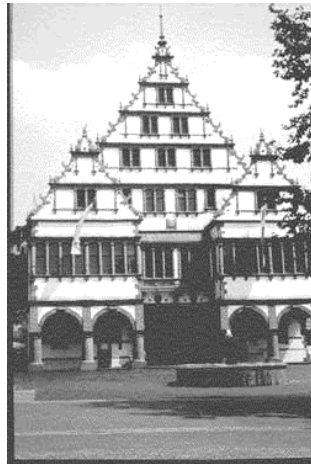
Paderborn is a well-known old town in the midst of Germany. The university of Paderborn has a very strong technical track. Prof. Dörrscheidt's department of control engineering is one of the largest departments at the university.

The conference will start on Sept. 11th with tutorials and user group meetings. The program of the following three days include: plenary and overview presentations, parallel sessions with presentations and discussions, industry sessions and workshops. An exhibition will be opened on all days.

The excursions and the social program start with a welcome party, followed by an excursion to the company HELLA, one of the largest suppliers for car electric equipments, a visit of the Nixdorf computer museum and a dinner in a historic small village.

Further information can be found at

- http://www-rt.upb.de/ASIM2001/
- http://www.asim-gi.org/2001/

For printed call for papers in German contact Ingrid Bausch-Gall.

Ingrid Bausch-Gall
BauschGall@compuserve.com

CROSSIM

CROSSIM (The Croatian Society for Simulation Modelling) was founded in 1992 in Zagreb. CROSSIM is a non-profit society with the following main goals: promotion of knowledge, methods and techniques of simulation; establishment of professional standards in simulation; development of education and training in simulation; organization of professional meetings and publishing in the field; cooperation with similar domestic and international institutions. From April 1997 CROSSIM is a full member of EUROSIM.

Membership

CROSSIM currently has 68 individual members. The annual membership fee is equivalent of 15 German marks for regular members, and 5 German marks for students.
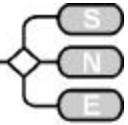
Contact Address

Vesna Bosilj Vuksic, Faculty of Economics
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10000 Zagreb, Croatia
Tel: +385 1 2383 282, Fax: - 2335 633
E-mail: vbosilj@efzg.hr

Activities

- Co-organizing the 23rd International Conference *"Information Technology Interfaces" ITI 2001,* Pula, Croatia, from June 19-22, 2000. The conference has traditionally a strong modelling and simulation session.
- Co-organizing the 3rd *European Ecological Modelling Conference* to be held in Croatia during September 2001. Proceedings of the 2nd conference will be published as a special issue of *Ecological Modelling Journal*, Elsevier.
- Regularly organizing a simulation seminar and workshops held at the Faculty of Economics, University of Zagreb. Members are encouraged to exchange experiences, discuss current problems and initiate cooperative activities.
- Work on scientific projects in discrete and continuos simulation, and applications of simulation in such diverse fields as engineering, economy, medicine, ecology etc.
- Publication of papers in international and domestic journals and conference proceedings.
- Cooperating in publishing CIT a Journal of Computing and Information Technology. The aim of the international **Journal of Computing and Information Technology (CIT)** is to present original scientific and professional papers, as well as review articles and surveys, covering the theory, practice

EUROSIM SOCIETIES

and methodology of computer science and engineering, modelling and simulation, and information systems.

- Preparing a booklet about the CROSSIM society
- The first WWW site in Croatian devoted to simulation was developed at the Faculty of Electrical Engineering and Computing. The address is: http://www.rasip.fer.hr/nastava/mis/. Initial WWW site is http://rudjer.irb.hr/~crossim
- CROSSIM e-mail distribution list at the Computing Centre of the University of Zagreb serves as a communication medium among members. To subscribe please send to LISTPROC@CARNET.HR a line of text (leave an empty subject line) SUBSCRIBE CROSSIM your name and surname. To send e-mail to all members at one just send an e-mail to: CROSSIM@CARNET.HR

V. Bosilj Vuksic

CSSS

General Information

CSSS (The Czech and Slovak Simulation Society) has about 90 members in 2 groups connected to the Czech and Slovak national scientific and technical societies. The main objectives of the society are: development of education and training in the field of modelling and simulation, organising professional workshops and conferences, disseminating information to its members about modelling and simulation activities in Europe, informing the members about publishing in the field of modelling and simulation. Since 1992 CSSS is a full member of EUROSIM

Past Event

The 34th International Conference on "Modelling and Simulation of Systems" (MOSIS'2000) that tooke place on the 2th to 4th May 2000 in Rožnov pod Radhoštem, Czech republic, was organised by the Department of Computer Science FEEI VŠB – Technical University Ostrava and Department of Computer Science of FEECS University of Technology Brno and sponsored by CSSS, ASU EUROSIM and SCS. Technical journal AUTOMATIZACE Praha was a medial sponsor. The Conference was connected with two Workshops: workshop ISM'2000 -Modelling of Information System and workshop MANAM'2000 - Modelling in Manager Works. Proceeding of the Colloquium have 690 pages in 3 volumes, with 100 reviewed papers. Some 110 participants from Czech republic, Slovakia, Polland, Germany, Malta, Korea, Greece, Russia and Breat Britain attended the workshop.

The 1th International Carpatian Control Conference ICCC 2000 took place on 23-26 May 2000 in Podbanske, hotel Permon, Slovak republic. One of the interesting point in topic was also Modeling and Simulation in Logistic and Automatic Control. The conference was organised by Slovak Society for Applied Cybernetic and Informatics, faculty BERG - Technical University Kosice, VŠB -TU Ostrava and AGU Krakow. The chairman of the conference was Prof. Ing. PhD D. Malindzak from TU Kosice Slovak republic. Some 210 participants attendet the conference.

The 7th International Symposium „Railways on the edge of third millennium"(ZEL '99) was succesfully held in Zilina, Slovak republic on May 30-31, 2000. One of the interesting point in topic was also presentation of PC programs from „Modelling and Simulation for Planning and Process Supervision on Railways". Some 175 participants from Slovakia, Czech Republic, Austria, Germany, France, Switzerland, Holland, Russia and Hungary attended the workshop.
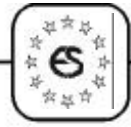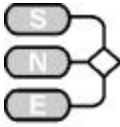
Coming Events

The International Workshop "Methodology of Modeling and Simulation" will take place on August 30-31, 2000 in Zilina, Slovak republic. The chairman of the workshop is Prof. M. Alexik. The 22st International Workshop „Advanced of Simulation Systems" (ASIS'200) will take place in the Moravian town Sv Hostýn, Czech republic on September 12-14, 2000. The chairman of the international program committee is Dr. Ing. Jan Stefan. The workshop will be connected with annual meeting of CSSS. The scientific conference with international participation "Electronic Computers and Informatics'2000" with a section on "Modelling and Simulation of the systems", will be held on September 28-30, 2000 in Herlany, Slovak republic. General chair of the conference is Prof Ing. Milan Jelsina Technical university Kosice, Slovak republic. Organization chair is Dr.Ing. J. Baca, (bacaj@tuke.sk)

Contact Addresses

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M. Alexík

EUROSIM 2001
SHAPING FUTURE WITH SIMULATION
4th International EUROSIM Congress

**incorporating the 2nd Conference on
Modelling and Simulation in Biology,
Medicine and Biomedical Engineering,
June 26-29, 2001, Delft, The Netherlands**

Please visit our website where you can find all latest news, o.a. the themes of the congress, currently proposed special symposia, information about the scientific and commercial exhibition etc.

Invited Speakers

❖ Dr. Steve Cohn, Data Assimilation Office, NASA/Goddard Space Flight Center,
Greenbelt, Maryland 20771, USA
Current Practice and Future Trends in Atmospheric Modeling and Data Assimilation

❖ Prof. dr. William N. Dunn, University of Pittsburg, Public and International Affairs,
Pittsburg, USA
A method for being approximately right, and not precisely wrong, in solving
complex sociotechnical problems

❖ Prof. dr. Thomas Ertl, Universität Stuttgart, Abt. Visualisierung und Interaktive Systeme,
Stuttgart, Germany
Scientific visualization of simulation results: new approaches between web-integration and
virtual reality.

❖ Prof. dr. Erol Gelenbe, University of Central Florida, Engineering and Computer Science,
Orlando, USA
Toward simulation environments with adaptive behaviours

❖ Prof. dr. Tuncer Oren, Marmara Research Center, Gebze-Kocaeli, Turkey
Impact of Data on Simulation: From early Practices to Federated and
Agent-Directed Simulations

❖ Dr. Eugene Shapiro, Stamford, USA
a. The Evolution of Computing Technology and the Art of Simulation.
b. Will, in a closing session, reflect on the particular issues presented
during the congress and provide a summary of emerging trends.

❖ Prof.dr. Herman Wind, University of Twente, Water Resources Management,
Enschede, The Netherlands
Integration in water management: loose ends or knots?

❖ Prof. dr. Joseph Wolfe, Experiential Adventures LLC, Tulsa, OK, USA
Who needs validity? Perspectives from the field of management education and
development

If you need information by telephone please contact:
Marja Dekker, tel: +31 10 5112714 or
Arnold Heemink, tel: +31 15 2785813

For information by regular mail, electronic mail or fax, please contact:
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c/o Mrs. T. Tijanova
Delft University of Technology, Faculty of Information Technology and Systems
P.O. Box 5031, 2600 GA Delft, The Netherlands
Fax: +31 15 2787209
Email: EUROSIM2001@pa.twi.tudelft.nl

http://ta.twi.tudelft.nl/PA/Eurosim2001/index.html

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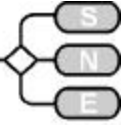
HSS

General Information

The Hungarian Member Society of EUROSIM was established in 1981 as an association promoting the exchange of information within the community of people involved in research, development, application and education of simulation in Hungary and also contributing to the enhancement of exchanging information between the Hungarian simulation community and the simulation communities abroad.

HSS deals with the organization of lectures, exhibitions, demonstrations, round table discussions and conferences.

Activities

At the Simulation Laboratory of the Department of Information Management on the Faculty of Economic and Social Sciences of the Technical University of Budapest a series of lectures on various aspects of simulation is held on a regular basis for students, academics and external experts of various fields.

In these lectures different simulation tools and fields of applications are dealt with.

We are co-operating in the organization of several international simulation conferences as

EUROSIM 2001 - the 4th International EUROSIM Congress,

where HSS is one of the co-sponsors.

Efforts are being made to increase the simulation activities in institutions located beyond the capital and include teaching staff and students as well as industry.

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Fax: +36-1 4634035,
Email: javor@eik.bme.hu

A. Jávor

DBSS

General Information

The Dutch Benelux Simulation Society (DBSS) was founded in July 1986 in order to create an organisation of simulation professionals within the Dutch language area. DBSS has actively promoted creation of similar organisations in other language areas.

DBSS is a member of EUROSIM and works in close cooperation with its members and is further affiliated with SCS International, IMACS, the Chinese Association for System Simulation and the Japanese Society for Simulation Technology.

Membership

Both corporate entities (companies, institutes, etc.) and individuals are welcome to join DBSS as full corporate or individual member.
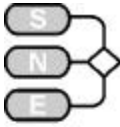
The contribution is divided in two options:

I. Dfl. 75,- individual member or Dfl. 150,- institutional member, which means that you will receive the newsletter Simulation News Europe three times a year.

II. Dfl. 150,- individual member or Dfl. 250,- institutional member, which means that you will receive the Journal Simulation Practice and Theory eight times a year, and the newsletter Simulation News Europe three times a year.

Becoming member of DBSS includes automatically being member of EUROSIM, the overall organisation of European Simulation Societies. DBSS members enjoy reduction of the fees attending the "EUROSIM events" which include congresses, conferences, symposia, workshops etc. For institutional members counts that they can join national "DBSS events" with three persons against the reduced fee.

Those interested to become a member of DBSS are invited to write to the secretary:

Dutch Benelux Simulation Society
Mrs. Marja Dekker-Genemans
Noordeindseweg 61,
2651 LE Berkel en Rodenrijs,
The Netherlands,
Tel: + 31 (0)10 51 12714,
Fax: +31 (0)10 51 13883,
Email L.Dekker@pa.twi.tudelft.nl

(Please mention your name, affiliation and address (including email, fax and telephone number), and indicate whether you are interested in the personal or institutional membership).

The Steering Committee exists of the following members:

A.W. Heemink (TU Delft): Chairman
L. Dekker: Vice-Chairman
M.J. Dekker-Genemans: Secretary
W. Smit (AKZO NOBEL): Treasurer
Th.L. van Stijn
(Ministry of Public Works/RIKZ): Member

Past Events

NOSMO-meeting, University of Amsterdam, February 20th, 2000.

The meeting was organized by Dr. Dorien Detombe and Dr. Cor van Dijkum, and was dedicated to two presentations with extended discussion possibilities.

In the first presentation, Dr. Erwin Rooze discussed some topics from his recent Ph.D. work, addressing the process in which people develop knowledge available in schemata into products and services. A key process in the thoughts of Rooze is the cycle in which data, knowledge, information and memes are generated. Rooze calls the four elements in this cycle:

1. reflection and proflection,
2. variation in elements,
3. frames, and
4. development and retention.

From this view point, he described the elementary process distinguishable in most developmental processes. Interesting is that Dr. Rooze could identify in his study four types of resistances which he called a mental prison consisting of four walls! This mental prison is not only visible and operational in individuals, but also in groups and institutions, and can be called a socially constructed prison or an institutionalised prison. The four walls he mentioned are:

1. explicit focus,
2. frame-in-use,
3. activated schemata, and
4. total memory.

The 2nd wall is the most difficult to give up!

The second presentation was given by ir. Huub Scholten of the University of Wageningen and was dedicated to a just finished manual, written for one of the Dutch Ministries, on Good Modeling Practices (GMP). Scholten paid a lot of attention to the different aspects of the modeling practice, especially when the model is also simulated by computers. Interesting was the filling in of the verification- and validation process which was made applicable for many disciplines.

Finally, Scholten paid some worthwhile remarks on the so-called Simulation Modeling Maturity (SMM), as recently developed by Humphrey c.s.

Wim and Iva Smit (DBSS)

Visit to two Universities in the United Arab Emirates (UAE), April 9-10, 2000.

During a trip to Dubai we were able to visit two Universities in the UAE. Goals of both visits were to stimulate the interest for the EUROSIM 2001 Congress in Delft, and to try to set up some regular contacts between the simulationists in the UAE and DBSS.

On April 9th we visited the Zayed University in Dubai, where we met Dr. Dell Felder, Deputy Vice President, Academic Affairs. Dr. Felder is in charge of starting up this University for women, and bringing it to the same level as established Western Universities. She has done similar work before in the USA (University of California, Monterey). Dr. Felder introduced us two deans, one responsible for information, and the other for information systems. We discussed our Congress in some length and we hope that this University will send some participants.

On April 10th we visited the United Arab Emirates University in Al-Ain. Here we met Dr. Jihad Mohaidat of the high-speed electronic laboratory and Prof. Dr. Gharib S. Aly, director of the Central Laboratories Unit. Both gentlemen have very active relations with the West, Dr. Mohaidat did his Ph.D. work in New York and has good contacts with the University of Eindhoven, and Prof. Aly still visits regularly the University of Lund in Sweden.

Both gentlemen liked the theme of the EUROSIM 2001 Congress and will also seek in their environment other people who might be interested.

They are both willing to distribute some promotion material we sent to them. It is interesting to see how international both Universities are in the UAE. Many professors and scientific staff are recruited from the USA, Europe (esp. UK), Pakistan, India and Malaysia.

Wim and Iva Smit (DBSS)
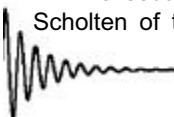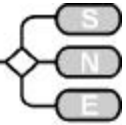
EUROSIM 2001

EUROSIM 2001 - SHAPING FUTURE WITH SIMULATION, the 4th International EUROSIM Congress, in which is incorporated the 2nd Conference on Modelling and Simulation in Biology, Medicine and Biomedical Engineering

June 26 - 29, 2001 in Delft, The Netherlands.

Please visit our website where you can find all latest news:

http://ta.twi.tudelft.nl/PA/Eurosim2001/index.html

Currently proposed special symposia

- Simulation in Air Traffic Management.
  Contactperson: Prof. Gaspare Galati, Tor Vergata University of Rome, Italy g.galati@ieee.org
- Transportation Network Simulation Contactperson: Prof. Agostino Nuzzolo, Tor Vergata University of Rome, Italy nuzzolo@ing.uniroma2.it
- Performance Evaluation of Parallel and Distributed Systems
  Contactperson: Prof. Helen Karatza, Aristotle University of Thessaloniki, Greece karatza@eng.auth.gr
- Frameworks for Modelling in Integral Water Management
  Contactperson: Dr. F. van der Ven, RWS/RIZA f.h.m.vdven@riza.rws.minvenw.nl
- Bondgraph Techniques
  Contactperson: Prof.Dr. J. Thoma, Switzerland Email: jthoma@access.ch
- Simulating Organisational Processes
  Contactperson: J. Richard Harrison, University of Texas at Dallas, USA Email: harrison@utdallas.edu
- Complex Societal Problems and the Use of Simulation
  Contactperson: Dr. Dorien J. DeTombe, Delft University of Technology Email: detombe@tbm.tudelft.nl
- Special Symposium Delft Cluster on Management of Sustainable Urban Infrastructure (Re)development
  Contactperson: Dr. Erik H.M. Mischgofsky, Delft University of Technology/Delft Cluster, Email: f.h.m.mischgofsky@geodelft.nl
- Simulation of smart systems in civil engineering
  Contactperson: Prof. Fabio Casciati, Università di Pavia, Italy, Email: fabio@dipmec.unipv.it
- Modeling and Simulation of Large-scale and Complex Structures
  Contactperson: Prof. Franco Maceri, Università

"Tor Vergata" di Roma, Italy, Email: maceri@lagrange.uniroma2.it
- Business Process Simulation
  Contactperson: Dr. Joseph Barjis, Email: j.barjis@is.twi.tudelft.nl
- Model Solving Software in the Internet Era
  Contactperson: Huub Scholten, Wageningen University, The Netherlands Email: Huub.Scholten@users.info.wau.nl

Commercial Exhibition

In line with tradition, a commercial exhibition will be organised in conjunction with our Congress. The exhibition will be open during the four Congress days, from June 26 to June 29, 2001.

Companies interested to take part in the commercial exhibition of this Simulation Congress, are kindly invited to contact the Congress organisation, either by regular mail or by email, mentioning the name of the company, complete address, tel./fax number and email address. Please include the name of your company's contact person and the size of the stand you wish.

The available stand sizes are:

- 6 (six) square meters
- 12 (twelve) square meters
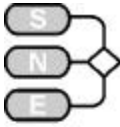- 20 (twenty) square meters

Each participant in the commercial exhibition will be provided with so-called "Lacet" panels, which are covered in blue, size 1 metre width and 2 metres high, tables (size 70 x 140 cm) and chairs. An internet connection will be provided, as well as a 220 volt connection.

A session will be organised for participants of the exhibition, where each particpant will have the opportunity to present a short summary of his/her exhibition. The name of the participating companies will be mentioned in the preliminary programme, the final programme and the Congress proceedings.

Scientific Exhibition

In line with tradition, a scientific exhibition will be organized in conjunction with our congress.

Themes The scientific exhibition aims to provide researchers from the scientific and engineering community the opportunity to demonstrate their modeling and simulation techniques, computer software, and simulation systems in general to the participants from industry, consultancy, engineering, universities, and research institutes.

Exhibitions related to any topic in the scope of the congress are solicited.

Structure of the exhibition Each participant in the scientific exhibition will be provided with a maximum of 3 so-called "Lacet" panels, which are covered in blue, size 1 metre width and 2 metres high, and a table (size 70x140 cm) and 2 chairs.

For computer demonstrations, a network connection can be provided upon request. Additional facilities also on request. A session will be organized for participants of the exhibition. Each participant has the opportunity to present a summary of his/her exhibition in three minutes.

Submission Interested participants in the exhibition are invited to submit an abstract (maximum 2 A4-pages) describing the subject and results. The abstract will be included in the proceedings of the congress.

There is no extra cost for participants from the scientific and research community in taking part in the exhibition. However, participation in the scientific exhibition doesnot automatically includes participation in the congress programme free of charge. Please indicate that the abstract is for the scientific exhibition and send it, preferable by email, to:

EUROSIM2001-abstracts@pa.twi.tudelft.nl

Tutorials

Free tutorials for all attendees by leading practitioners and researchers in the field of simulation.

Attendees of the Eurosim 2001 Simulation Congress may attend all tutorials for free. There are three categories: Introductory, Advanced and Software tutorials.

Currently proposed tutorials

Introductory tutorials

- Prof.Dr. C. van Halem, OASIS, Free University Amsterdam, The Netherlands: Simulation in Management

- Dr. J. Halin, ETH ZURICH, Switzerland: Modeling and simulation: with the emphasis on engineering, scientific, social and economic applications

- Prof.Dr. J.P.C. Kleijnen, Tilburg University, The Netherlands: Simulation and statistics

- Prof.Dr. A. Sydow, GMD First, Berlin, Germany: Continuous simulation

Advanced tutorials

- Dr. Dorien J. DeTombe, Delft University of Technology, The Netherlands: Handling complex societal problems: The Compram Method

- Fred Glover, James Kelly and Manuel Laguna, School of Business, University of Colorado, U.S.A: New advances combining optimization and Simulation

- Prof. Dr. Florin Stanciulescu, National Institute for R&D in Informatics, Averescu Avenue 8-10, 71316 Bucharest, Romania, email: sflorin@u3.ici.ro: Mathematical-heuristic modelling and its application in high complexity systems simulation.

- Prof. Zoltan Szallasi, Department of Pharmacology, Uniformed Services, University of the Health Sciences, Bethesda, U.S.A.: Generative models and simulations in genetic network analysis.

Simulation software tutorials

- H. Heuvelmans, OASIS, Amsterdam, The Netherlands: How can one make a good simulation model with the help of POWERSIM - A scenario analysis

- Martin te Lintelo, Rockwell Automation (former Systems Modeling Corporation): The ARENA product family

For information by regular mail, electronic mail or fax, please contact:

EUROSIM 2001 Organisation,
c/o Mrs. T. Tijanova
Delft University of Technology,
Faculty of Information Technology and Systems
P.O. Box 5031,
2600 GA Delft,
The Netherlands
Fax: +31 15 2787209,
Email: EUROSIM2001@pa.twi.tudelft.nl

If you need information by telephone please contact:

Marja Dekker, tel: +31 10 5112714 or
Arnold Heemink, tel: +31 15 2785813

Marja Dekker-Genemans

EUROSIM SOCIETIES
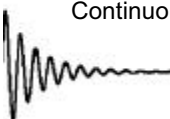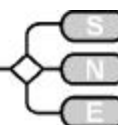
PSCS

General Information

PSCS (The Polish Society for Computer Simulation) was founded in 1993 in Warsaw. PSCS is a scientific, non-profit association of members from universities, research institutes and industry in Poland with common interests in variety of methods of computer simulations and its applications.

At present PSCS counts 209 members. The Board of third cadence consisting of the following persons directs the affairs of the PSCS:

- Andrzej Tylikowski - President
- Leon Bobrowski - V-ce President
- Andrzej Chudzikiewicz - V-ce President
- Zenon Sosnowski - Secretary
- Kazimierz Furmanik- Treasurer
- Roman Bogacz
- Jaroslaw Rybicki
- Zygmunt Strzyzakowski

Activity

The main activity of the Polish Society for Computer Simulation are annual conferences known as "PSCS Workshops on Simulation in Research and Development". The PSCS Workshops were organized in: Mielno (1994), Warszawa (1995), Wigry (1996), Jelenia Gora (1997, 1998), Bialystok-Bialowieza (1999).

Past Events

On January 21, 2000 the general assembly of PSCS members was held in Warsaw. This meeting, besides representing an interest forum to discuss and promote the activity of the society, was the occasion to elect the Board for the period 2000-2002.

Publications

Proceedings of the 5th PSCS Workshop on "Simulation in Research and Development", R.Bogacz and A. Tylikowski (Eds.), Warsaw, 1999, ISBN 83-902146-2-8, (in Polish). The price is 20,- PLN.

Coming Events

Prof. E. Kolodzinski and Prof. Z. Strzyzakowski will organize the 7th PSCS Workshop on "Simulation in Research and Development" on September 14-16, 2000 in Zakopane-Koscielsko, Poland.

E-mail: gogolek@ias.wat.waw.pl

Contact Address

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The Polish Society for Computer Simulation
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e-mail: Andrzej.Tylikowski@simr.pw.edu.pl

Z. Sosnowski

AES

Spanish Simulation Society
Contact Address

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Spain
Tel: +34-1 394 43 87,
Fax: +34-1-394 46 87
email: gironsi@dia.ucm.es
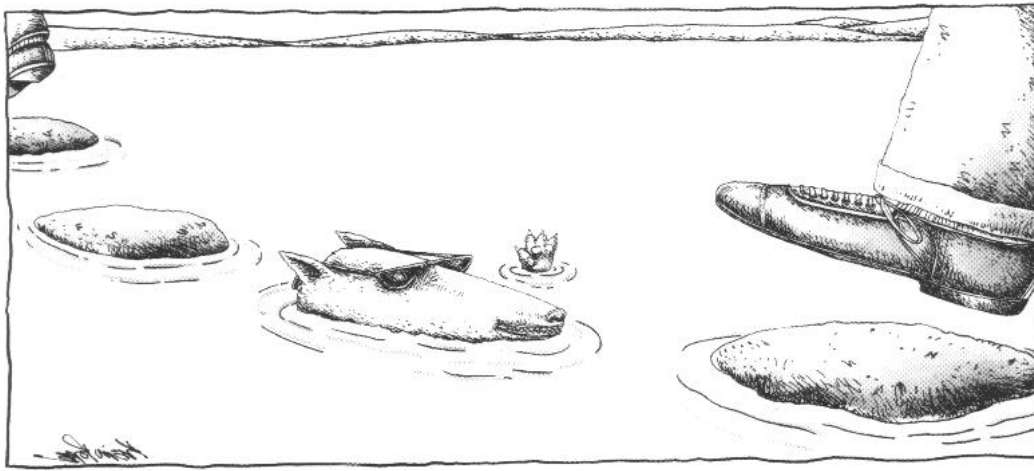
EUROSIM 2001
SHAPING FUTURE WITH SIMULATION

4th International EUROSIM Congress
June 26-29, 2001
Delft, The Netherlands
http://ta.twi.tudelft.nl/PA/Eurosim2001/

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EUROSIM SOCIETIES

FRANCOSIM

FRANCOSIM was created in 1991 and aims to the promotion of simulation and research, in industry and academic fields. It has members from large French companies and members of Belgian and French universities.

Francosim operates two poles:

- Modelling & simulation of continuous systems
- Modelling & simulation of discrete events systems

Modelling & simulation of discrete events systems

A large community of researchers interested in discrete event simulation exists in France. application areas are varied and include: hospitals, harbours, transportation systems, computers and industrial systems. Manufacturing systems are probably the main area of interest of FRANCOSIM members from the discrete side. Simulation is used and studied both by academic institutions and by industrial companies.

To improve the necessary synergy between industry and academia people in the area of system modelling, the series of conferences "MOSIM" (Modelling and simulation)has been initiated after the success of a first conference on modelling and simulation in production management in Clermont Ferrand with the support of the AFCET and the French CNRS through the "GDR automatique").

This pole co-organises next year the following conference MOSIM'01: "Industrial systems design, analysis and management", April 25-27, 2001, Troyes (France) – for further Information see below

Pole contact

Professor Henri Pierreval,
IFMA, Campus des Cezeaux,
BP 265, F-63175 Aubiere, Cedex, France.
Tel. +33 (0)4 73 28 81 06,
Fax. +33 (0)4 73 28 81 00,
e-mail pierreva@ifma.fr

Modelling & simulation of continuous systems

This pole has been working for several years and has already organised 3 workshops (2AO92, 2AO94, 2AO96) which grouped industrials and academics in the field of modelling and simulation of continuous systems. It has also produced a document for the evaluation of modelling and simulation software which was published in the Eurosim 1995 Congress in Vi-

enna. The pole is presently reorienting its work towards the organisation of one day workshops on specific subjects. It had organised in April 1999 BioMed-Sim'99, a conference on modelling and simulation in medicine and biology. This conference has led to the selection of several papers to appear in a special issue of Simpra. This pole will organise in 2001 the 2nd BioMedSim'01 in parallel with EuroSim congress.

Pole contact

Prof. Y.Hamam
Groupe ESIEE, Cité Descartes, BP 99
2 Bd. Blaise Pascal
F. 93162 Noisy le Grand CEDEXm FRANCE
Fax: +33-1-45 92 66 99
Tel: +33-1-45 92 66 11
email: hamam@esiee.fr
http://www.esiee.fr/~hamamy

Conference Announcement

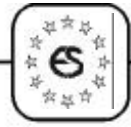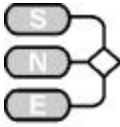Modelling and Simulation (MOSIM'01) "Industrial systems design, analysis and management" conference

News and highlights are:

1. "Young researcher award "
2. Some international journals, for instance International Journal of Production Research (IJPR), will select papers at MOSIM conference
3. Special issue of RAIRO-APII-JESA journal
4. Plenary conferences of Professors Jerry Banks (USA) and Henri Pierreval (France)
5. Several special sessions are already under organization: Line balancing, Supply chain optimization,
6. papers in English are accepted where there is not any French-speaking author.

For more information, please visit the following site http://www.univ-troyes.fr/mosim01

Chairman of the Organizing Committee

Alexandre B. DOLGUI, Ph.D.
Industrial Systems Optimization Laboratory,
Industrial Engineering Department,
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Web: http://www.univ-troyes.fr/mosim01

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email: imagine@amesim.com

Francis Lorenz (vice-président)
Centre Socran, Parc Scientific
Ave. Pré-Aily, B-4131 Liège
Tel:+32 4 367.83.75,
Fax: +32 4 367.83.00
email: lorsim@lorsim.be

Y. Hamann
hamann@esiee.fr

ISCS

The Italian Society for Computer Simulation (ISCS) is a scientific non-profit association of members from industry, university, education and several public and research institutions with common interest in all fields of computer simulation. Its primary purpose is to facilitate communication among those engaged in all aspects of simulation for scientific, technical or educational purposes.

The affairs of the ISCS are directed by a Steering Committee presently consisting of:

Giuseppe Iazeolla   chairman
Mario Savastano   vice-chairman
Vincenzo Grassi   treasurer
Vittorio Cortellessa secretary
Pasquale Daponte committee member
Franco Maceri   retiring chairman

Contact Address

For further information or application for membership, please contact:

ISCS c/o Dipartimento Ingegneria Informatica
Università di Roma „Tor Vergata"
Via di Tor Vergata, I-00133 Roma, Italy
Tel: +39-6 7259.7380 -.7381 Fax: -7460
email: {grassi,cortelle}@info.utovrm.it
http://remlab.dis.unina.it/iscs/iscs_hp.htm

Coming Events

ISCS 2000

Italian Society for Computer Simulation - Annual
Conference Lecce, December 15 2000
Dipartimento di Ingegneria dell'Innovazione -
Università di Lecce, Via per Monteroni

Topics of interest include:

- Simulation methodologies
- Software applications and tools for simulation
- Object and agent based simulation
- Distributed and parallel simulation
- Simulation and virtual reality
- Animated simulation
- Web based simulation
- Simulation in transportation, trafic and telecommunication systems
- Simulation in economy
- Simulation of ecological and environmental systems
- Simulation in software engineering
- Simulation in manufacturing engineering
- Simulation in education
- Simulation in artificial intelligence
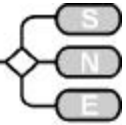- Simulation in medicine

Program Committee

Giuseppe IAZEOLLA (Chair), Università di Roma" Tor Vergata"; Franco MACERI, Università di Roma" Tor Vergata"; Alfredo ANGLANI, Università di Lecce; Felice CENNAMO, Università di Napoli "Federico II"; Lorenzo DONATIELLO, Università di Bologna; Pasquale DAPONTE, Università del Sannio; Vincenzo GRASSI, Università di Roma" Tor Vergata"; Angelo LEONARDI, Università di Roma" Tor Vergata"; Michele COLAJANNI, Università di Modena e Reggio Emilia; Vittorio CORTELLESSA, Università di Roma" Tor Vergata"; Andrea D'AMBROGIO, Università di Roma" Tor Vergata"; Raffaela MIRANDOLA, Università di Roma" Tor Vergata"; Mario SAVASTANO, Università di Napoli "Federico II"

Organising Committee

Vittorio CORTELLESSA (Chair), Università di Roma" Tor Vergata"; Antonio GRIECO, Università di Lecce; Francesco NUCCI, Università di Lecce The conference web page (in italian language) is available at: http://lesim1.ing.unisannio.it/iscs/main_page.htm. Selected papers will be considered for publication on Simulation Practice and Theory

General info

Segreteria ISCS 2000
attn. Prof. Vincenzo Grassi;
Università di Roma "Tor Vergata",
Dipartimento di Informatica Sistemi e
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e-mail: antonio.grieco@unile.it

V. Cortellessa
cortelle@info.uniroma2.it

ROMSIM

Romanian Simulation Society

ROMSIM - ROmanian Society for Modelling and SIMulation, has been founded in 1990 as a non-profit society devoted to both theoretical and applied aspects of computer modelling and simulation of systems. In April 1999 ROMSIM has been accepted as observer society in EUROSIM.

Contact Address

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National Institute for R&D in Informatics
Averescu Avenue 8-10
RO-71316 Bucharest, Romania
email: sflorin@u3.ici.ro

SIMS

Scandinavian Simulation Society

SIMS is the Scandinavian Simulation Society with members from the four Nordic countries Denmark, Finland, Norway and Sweden. The SIMS history goes back to 1959. SIMS practical matters are taken care of by the SIMS board consisting of two representatives from each Nordic country.

The SIMS annual meeting takes place at the annual SIMS conference or in connection to international simulation conferences arranged in the Nordic countries.

The SIMS Board

Peter Fritzson, chairman
Bernt Lie, vice chairman
Arne Jakobsen, secretary
Kaj Juslin, treasurer
Björn Bergström
Esko Juuso, Falko Wagner, Anne Elster

Activities

A reorganisation of SIMS was initiated at the 1999 meeting in Linköping, in order make SIMS a more active organization and stimulate local activities in each

of the four Scandinavian countries. It was decided that the board should prepare a proposal for new Bylaws according to these goals, and to prepare formal registration of the society.

The new Bylaws were presented and approved by the SIMS annual meeting in Lyngby, Sept 19, 2000 and at the extra SIMS general meeting in Linköping, Oct 19, 2000. According to these new Bylaws, SIMS can now also have organisational members, and an individual member becomes a member of SIMS by joining one of the local SIMS member organisations.

Recent SIMS conferences and SIMS annual meetings were held in Linköping, Sweden, Oct 18-19, 1999, and in Lyngby, Denmark, Sept 18-19, 2000.

Recent Board meetings were held in Linköping, 18 October 1999, and in Linköping, 18 August 2000.

The general goals for the society are the following:

- further the science and practice of modelling and simulation in all application areas
- be a Scandinavian forum for information interchange among modelling and simulation professionals and non-professionals in Denmark, Finland, Norway and Sweden
- be a channel for information exchange between the Scandinavian modelling and simulation community and the international modelling and simulation communities.
The society pursues its goals by:

- arranging technical and scientific meetings and symposia
- supporting lecturing and publication
- collecting and disseminating information
- maintaining contacts with national and international organizations with similar purposes
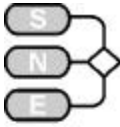
Past Events

SIMS 1999 was organized at Linköping University, Linköping, Sweden, October 18-19, 1999. The special conference theme was multi-domain simulation, and a number of presentations were given on the new modeling language Modelica. SIMS 2000 was organized at the Technical University of Denmark, Lyngby, Denmark (see report in this section).

Coming Events

The SIMS conference 2001, will take place in Porsgrunn (not far from Oslo), Norway, approximately 17th and 18th of September, 2001. The local organiser is Bernt Lie (Bernt.Lie@hit.no)

EUROSIM SOCIETEIES
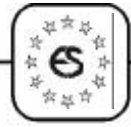
Recent Publications

Proceedings of SIMS'99, ed. Peter Fritzson, Department of Computer and Information Science, Linköping University, Linköping, Sweden, Oct 18-19, 1999.

Proceedings of SIMS'2000, ed. Arne Jakobsen, Department of Energy Engineering, Technical University of Denmark, Denmark

Contact Information

Updated SIMS web page with news and recent information:

http://browse.to/sims or
http://www.ida.liu.se/~pelab/sims

You can contact the chair of the SIMS board, Prof. Peter Fritzson (Linköping University, Sweden),

Peter Fritzson, IDA, Linköping University,
58183, Linköping, Sweden.
Tel: + 46 13 281484 Fax: +46 13 284499
Email: petfr@ida.liu.se

To become a member of SIMS you should join one of the SIMS member organizations, as specified on the SIMS web page, e.g. MoSis, the Society for Modelling and Simulation in Sweden, or FSF, the Finnish Simulation Forum.

Finnish Simulation Forum (FSF)

The Finnish Simulation Forum (FSF) is a new section of the Finnish Society of Automation. FSF is a member organisation of the Scandinavian Simulation Society (SIMS), and all the members of FSF are also individual members of SIMS.

The Finnish Society of Automation (FSA), founded in 1953, is a professional association for specialists within the field of automation technology. The FSA operations cover all branches of the industry. The members represent various fields of automation, including trade, research, manufacturing, education, design and use.

The Aim of the Society is to promote control theory, technological development and industrial applications, be a forum for members and all users of automation to disseminate technological experience and to advance professional skills, enhance exchange of information between domestic and international organizations. More information is available from

http://www.automaatioseura.fi/indexen.html

Further information

Esko Juuso
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Fax. +358-8-5532466, Email:
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MoSis - The Society for Modelling and Simulation in Sweden

The Society for Modelling and Simulation in Sweden (MoSiS) is a non-profit society for furthering of the use of modelling and simulation (M&S) in research, development, production, procurement, education, management, and general problem-solving.
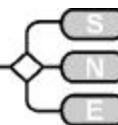
The society was formed on the 22nd May, 1996, and has today grown to some seventy members.

The purpose of the society is, among other activities, attained by

- increasing the members knowledge about science and technology for M&S,
- promoting understanding and interest in M&S within the information technology trade,
- collecting and disseminating M&S-related information,
- co-operating with authorities, academic institutions, business corporations, societies, and other bodies using M&S and related technologies in Sweden and abroad, and participating in the distribution of information about the sponsor organisations.

The Society's activities have the form of lectures, study visits, symposiums, information distribution, and participation in M&S projects. The Society organises special committees for work within different M&S areas. Currently there are committees for general simulation techniques, distributed simulation, environment simulation, domain handling, and re-use.

The Society is open to all who wish to contribute to its goals. Membership is either individual or in the form of sponsorship. Individual membership is gained by submitting a membership application and paying the individual membership fee, while sponsorship status is established by special agreement with each sponsor organisation.

EUROSIM SOCIETIES

The annual membership fee for individuals is SEK 250 per year. The membership fee is reduced to SEK 50 per year for students.

The standard language of the Society is Swedish, but English is used whenever convenient.

Information

http://www.mosis.a.se/
mosis@st.se

Arne Jakobsen

SLOSIM

General information

SLOSIM (Slovenian Society for Modelling and Simulation) was established in 1994 and become the full member of Eurosim in 1996. It has 85 members from both Slovenian universities, institutes and industry as well and aims the promotion of modelling and simulation in industrial and academic environments and to facilitate communication among corresponding groups.

Contact Address

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Email: borut.zupancic@fe.uni-lj.si
        slosim@fe.uni-lj.si
(member of the Editorial board of SNE)

News

On May 19, 2000 there was the lecture of Prof. Job van Amerongen, Drebbel Research Institute for Systems Engineering, and Control Laboratory, Faculty of Electrical Engineering, University of Twente, Netherlands. The lecture took place on the Faculty of El. Eng., University of Ljubljana. The title was: "Modelling, Simulation and Controller Design of Mechatronic Systems with 20-sim 3.0"

On May 19, 2000 SLOSIM board had a regular meeting at the Faculty of Electrical Engineering, University of Ljubljana. Current and future activities were discussed, the new WEB page was presented.

The new SLOSIM WEB page in SLOVENE language was introduced.

http://msc.fe.uni-lj.si/SLOSIM/

Some plans in recent future

- Cooperation in organization of the traditional ELECTROTECHNICAL AND COMPUTER CONFERENCE ERK'2000 in Portoroz, organization of two or three simulation sessions. A Call for papers has been already sent to our members. More information can be found on http://www.ieee.si/erk00/
- Annual assembly meeting in November.
- Group presentation meeting at Jozef Stefan Institute, Department for robotics in November.

The president of SLOSIM participated the EUROSIM board meeting in Prague, june 19, 2000 where he presented some remarks and suggestions:

- Future board meetings should take place during conferences.
- The EUROSIM congress must become the leading simulation event with strong(er) support of all simulation societies. So the date should be fixed long before (preferably always in the same period – september), other events should adapt to it.
- No need that the venue of EUROSIM congress is in conjunction with the EUROSIM presidency. In this way the activities can be spread between more countries. Stronger societies (with strong industry support, good organization, massive membership, …) are more convenient to have the presidency. However smaller and younger societies are usually from countries which are quite attractive for congress organization.
- SLOSIM expressed several times the willingness for simulation events organisations, also for the organisation of EUROSIM congress. So a regular queue should be established.
- Some kind of permanent evaluation of the acitivties of particular simulation societies would be helpful in order to raise the importance of EUROSIM association taking into account: no. of different events organised by particular simulation society, no. of members/number of inhabitants, orders of SNE, SIMPRA, participation on Eurosim board meetings, no. of attendants on Eurosim conferences, congress, The specifics and possibilities of different countries should be taken into account.

The presentation of an Interdisciplinary research group for modelling and simulation in pharmacokinetics at the University of Ljubljana which took place on Nov. 1999 is described in this SNE.

Borut Zupancic
zupancic@fe.uni-lj.si

EUROSIM SOCIETEIES

EUROSIM SOCIETIES

UKSIM

United Kingdom Simulation Society
General Information

The UK Simulation Society has about 80 members throughout the UK from both universities and industry. It is active in all areas of simulation and holds a biennial conference as well as regular smaller meetings and seminars.

Conferences

UKSim 2001 Fifth United Kingdom Simulation Society Conference Emmanuel College, Cambridge, England. 28th-30th March 2001. Info see below

Membership

Membership of the UK Simulation Society is very good value at only £20 per year including a subscription to Simulation News Europe. For more information, contact the Membership Secretary,

Dr. Richard Cant,
UKSim Membership Secretary
Dept of Computing,
The Nottingham Trent University,
Nottingham,
NG1 4BU.

Gary G. Gray
gary@dcs.gla.ac.uk

Announcement and Call for Papers

Fifth United Kingdom Simulation Society Conference UKSim 2001 Emmanuel College, Cambridge, England. 28th-30th March 2001

Papers are invited on any aspect of simulation to be presented at a three day event to be held at Emmanuel College, Cambridge. The college was founded by Sir Walter Mildmay in 1584 on the site of a former priory of the Dominican Order, also known as the Black Friars or Preachers, see conference website for more detail:

http://ducati.doc.ntu.ac.uk/uksim/uksim'01/CFP-uksim'01.htm

The accommodation, renowned catering and conference facilities are an ideal blend of modern and historic. The venue offers an especially attractive opportunity for both professional discussion and social activities.

Abstracts (two pages of A4 without figures) are invited on any aspect of simulation including: Simulation methodology and practice, languages, tools and techniques. Models and modelling tools. Data/object bases. Analysis and statistica1 tools. Simulators and simulation hardware, training simulators. Integration of simulation with concurrent engineering, integrated design and simulation systems. AI in simulation, philosophical issues, analogies, metaphors, knowledge modelling, automatic acquisition and synthesis of new knowledge/models, intelligent/adaptive behaviour, man/machine interaction. Parallel and distributed simulation. Artificial neural networks, quantum computing, other.

Simulation applications may include: aerospace; electronic circuits, computer architectures and systems, computer networks; business, management, finance, economics; leisure, games, conflict/rebellion modelling; humanities, literature semantics modelling/dynamics; biology, medicine, public health; manufacturing, planning, control, robotics; measurement, monitoring, safety critica1 systems; transportation, energy, oil, gas, other; education and training; military systems.

Exhibitors: manufacturers of software and hardware, publishers, etc., are invited to apply to exhibit their products. Accepted papers will be published in the Proceedings of the Conference; selected papers will be considered for publication in the International Journal of Simulation Systems Science & Technology.

Although a national event, presenters and participants from any country are also welcome, especially EUROSIM member countries.

Deadlines

15 January 2001: Abstracts (electronic submission, two A4 pages), Proposals for Sessions & tutorials, Applications for exhibition of products, to

dad@doc.ntu.ac.uk

- 1 February 2001: Notification of acceptance.
- 1 March 2001: Receipt of final camera ready papers.

All presenting authors must register with payment by the 1 March 2001 deadline for their papers to appear in the proceedings.

Further particulars: from the conference chairs: Russell Cheng *rchc@maths.soton.ac.uk*, or David Al-Dabass *dad@doc.ntu.ac.uk*

SCS SOCIETIES

SCS Europe

SCS is the international, multidisciplinary forum dedicated to research, development, application and education in modelling and simulation. Since its founding in 1952, the Society for Computer Modelling and Simulation operates an office in San Diego, California, USA, and in 1985 an European Office was started in Ghent, Belgium. The European SCS office was changed 1994 into SCS Europe BVBA, which now is the organisational and financial organisation behind the SCS European Council, which was established in 1991.

SCS Europe BVBA runs the SCS European Publishing House and organises international scientific conferences on computer modelling and simulation and related fields. On a yearly basis the office takes care of the "European Simulation Multiconference", the ESM, and the "European Simulation Symposium", the ESS, and several smaller conferences.

All these activities are in close co-operation with the SCS European Council. In 1998 SCS Europe and ASIM agreed for a closer co-operation in conferences and publishing activities. This result in a framework of an agreement between SCS Europe and ASIM and the first ASIM/ESS Joint Conference in September 2000 in Hamburg.

SCS European Council

As already mentioned in SNE, number 27, November 1999, a new chair of the SCS European Council was elected. During the first meeting of the SCS European Council at Hamburg, July 3rd 1999, an executive committee (ExCom) was introduced, for faster reaction and communication to the SCS Europe members. The ExCom of the council board is as follows:

- European Council Board Chair: Dietmar Möller
- European Conference Board Chair: Andre Bargiela
- Publishing: Rainer Rimane
- Office: Philippe Geril
- Industry: Wilfried Krug

Annual Meeting

During the annual meeting of the SCS European Council at Hamburg, October, 1st 2000, a SCS Past President report was given by Prof. Axel Lehmann,

and a report of the SCS Group of advisors, by Prof. Dr. Roy Crosbie. The co-operation with ASIM is well in place, and joint publications are well under way. Due to the ASIM support of SCS Europe events like ESM and ESS, the council should decide for a reduction rate of conference fees for ASIM members, participating ESM and ESS, when organised as joint conferences.

Prof. Dr. Andrzej Bargiela and Philip Geril report on SCS Europe conferences:

- Euromedia Antwerp, together with Flemish Institute of Engineers.
- ECEC Leicester
- Agent Based, Passau. Again in Passau next years
- ESM Ghent
- Foodsim. Nantes
- MESM'2000, Amman. Opening session was done by King Hassan.
- Watermatex co-sponsored, successful. The proceedings will have the SCS logo.

Foregoing SCS-related Event

The 12th European Simulation Symposium in Industry conference took place in Hamburg from 27 to 30 of September 2000. The ESS 2000 was the first ASIM/ SCS Joint Conference, announced as ASIM/ESS 2000 Joint Conference on Modelling and Simulation. Chairman of the ASIM 2000 Conference was Prof. Dr.-Ing. Dietmar P. F. Möller

About 150 specialists of simulation in industry and research exchanged their experiences. During the conference tutorials and workshops are offered:. The tutorials run very successfully: "Virtual Reality" by Dipl. Inf. Björn Kesper and Prof. Dr.-Ing. Dietmar P. F. Möller, University of Hamburg, "Java" by SUN Microsystems, Hamburg. Also the workshops were quite successful: "HLA" by Prof. Dr. Roy Crosbie, California State University, Chico, and "Passion" by Prof. Dr. Stanislaw Raczynsky, Universidad Panamericana, Mexico City.

SCS SOCIETIES

The opening ceremony of the conference took place Wednesday, September 27th by welcome addresses given by Prof. Dr.-Ing. Dietmar P. F. Möller, General Conference Chair (Picture above), Vice President Prof. Dr. Dr. h.c. Wilfried Hartmann, University of Hamburg, and SCS Past President Prof. Dr. Axel Lehmann (Picture below).

The opening plenary lecture was given Thursday, September 28th by Dr. Richard Smyth, EADS, Bremen, Germany, on " Systems Engineering in Avionics". The second plenary lecture was given by Prof. Dr. Stanislaw Raczynsky, Universidad Panamerica, Mexico City, on "Alternative Mathematical Tools for Modelling and Simulation: Metric Space of Models: Uncertainty, Differential Inclusions and Semi-Discrete Events". Moreover an exhibition, and two excursions to the Hamburg Underground Training Simulator had been included in the conference program.

Coming SCS Events

- 2001 ESM'15 Prague
- 2001 ESS'13 Marseille
- 2002 ESM'16 DElft
- 2002 ESS'14 Dresden
- 2003 ESM'17 Budapest
- 2003 ESS'15 Portugal

For more details about SCS or SCS related events, please have a look to our website:

http://hobbes.rug.ac.be/~scs/

or contact:

Philippe Geril, SCS Europe BVBA,
University of Ghent, Coupure Links 653,
B-9000 Ghent, Belgium,
tel: ++32-9-233-7790, fax: ++32-9-223-4941,
email: philippe.geril@rug.ac.be.

SCS European Publishing House

The co-operation between SCS BVBA and ASIM is still running well for the book series "Advances in Simulation" and "Frontiers in Simulation". The newest book (in German language) in the series "Frontiers in Simulation" is: Simulationstechnik, 14. Symposium in Hamburg, September 2000, ISBN 1-56555-189-3, edited by Prof. Dr. Dietmar P. F. Möller.

If you are interested in the SCS / ASIM book series please contact Rainer Rimane, University of Erlangen-Nuremberg, Institute of Informatics IV, Martensstr. 1, D-91058 Erlangen, Germany, phone: ++49-9131-66247;
email: rimane@-informatik.uni-erlangen.de.

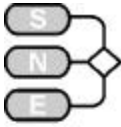## MISS McLeod Institute of Simulation Sciences

The purposes of the McLeod Institute of Simulation Sciences are to:

1. encourage and coordinate research in computer modelling and simulation.
2. enhance opportunities for undergraduate and graduate research and training.
3. stimulate the development, use, and evaluation of new instructional techniques and materials which make use of simulation.

The Institute is named to honor Mr. John McLeod, P.E., the founder of SCS, and the first editor of the journal Simulation.

Activities include

- Engaging in basic and applied research by faculty, students, and associates concentrated in the areas of design, implementation, application, and evaluation of computer simulation tools and techniques.
- Establishing and maintaining liaison with researchers elsewhere, especially in the MISS network, with the Society for Computer Simulation International (SCS) and other appropriate professional, industrial, and student organizations.
- Preparing and presenting workshops, seminars, symposia, on modelling and simulation and aimed at diverse audiences including researchers in academia and industry, teachers, students, and others.
- Encouraging and facilitating cross-disciplinary research in computer simulation.
- Encouraging and facilitating the use of simulation techniques and materials in courses throughout the University and elsewhere.
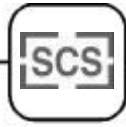
Contact

Roy E. Crosbie, Institute Director, University of Liverpool, England
Email: crosbie@ecst.csuchico.edu

European Centers

There are 12 MISS centers in Europe working in the fields modeling and simulation research, application and education.

Universities who are interested joining SCS becoming a MISS centers may contact the

SCS MISS International
Director Prof. Dr. D.P.F.Möller,
University of Hamburg,
Faculty Computer Science,
Chair Computer Engineering – AB TIS,
Vogt-Kölln-Str. 30, D-22527 Hamburg,
tel:++49-40-42883-2438;
fax: ++49-40-42883-2552;
email: dietmar.moeller@informatik.uni-hamburg.de
www.informatik.uni-hamburg.de/TIS/

Liophant Simulation Club

The Liophant Simulation Club is a Chapter of the Society for Computer Simulation International

The Liophant Simulation Club is an association born in Genoa University to promote and diffuse the simulation techniques and methodologies; the Club promotes exchange of students, sabbatical years, attendance to International Conferences, organisation of courses and stages in companies to apply the simulation to real problems.

The Club promotes Students/Teachers exchanges in order to improve international co-operation;

New Sections of the Liophant Simulation Club

The Club can establish new local Sections merging together people interested in Simulation Field; in order to promote the development of Simulation also in new areas the Club can support the new sections by providing web spaces, promotion support and also the club gadget/material.

Information

The Liophant Simulation Club
c/o Agostino Bruzzone, Logistics Laboratory
Savona Campus - Genoa University
Engineering Departments
Ex-Caserma Bligny - via Molinero
17100 Savona, Italy
Tel: +39 19 97398 Fax: +39 19 97600
Email: liophant@itim.unige.it
http://st.itim.unige.it/liophant/liophant.html

The Liophant is a Mythological Being that only Simulation can bring back to Life !

Winter Simulation Conference

The Premier Forum on Simulation Practice and Theory

Introduction. The Winter Simulation Conference (WSC) is the premier international forum for disseminating recent advances in the field of system simulation, with the principal focus being discrete-event simulation and combined discrete-continuous simulation. In addition to a technical program of unsurpassed scope and quality, WSC provides the central meeting place for simulation practitioners, researchers, and vendors drawn from all disciplines and from the industrial, governmental, and academic sectors.

Overview of the Conference. The Winter Simulation Conference features tracks devoted to leading-edge developments in analysis and modelling methodology as well as a diverse range of application areas, including: business process engineering; computer and communication systems; construction engineering and project management; education; healthcare; logistics, transportation, and distribution; manufacturing; military operations; and web-based simulation. Moreover, WSC offers an invaluable educational opportunity for novices and experts alike, with a large segment of each program devoted to introductory and advanced tutorials which are carefully designed to address the needs of simulation professionals at all levels of expertise and which are presented by prominent individuals in the field. Of particular interest to virtually all attendees are the software tutorials and the exhibits by software and hardware vendors which cover the

full spectrum of commercial simulation products and services. Issued to each registrant at the beginning of the conference, the Proceedings of the Winter Simulation Conference contains complete documentation on the technical program.

Rounding out the attractions of WSC are meetings of several professional societies and users' groups along with social events which give attendees many opportunities to get acquainted and to become involved in the ongoing activities of the international simulation community.

Scope and Layout of the Program. In recent years the WSC program has been organised into broad subject-area categories (or tracks) that reflect the current state of the simulation field as well as the mix of interests and professional orientations of conference attendees. Although the content and structure of these tracks varies to some extent from year to year, generally each WSC contains tracks organised along the following lines:

- Introductory and Advanced Tutorials
- Software Tutorials
- Modelling Methodology
- Analysis Methodology
- Manufacturing Applications
- Military Applications
- Logistics, Transportation, and Distribution Applications
- General Applications
- Poster Session
- Ph.D.-Student Colloquium

Highlights of WSC 2000. WSC '00 will be held December 10–13, 2000, at the Wyndham Palace Resort and Spa in Orlando, Florida.

WSC '00 takes place in the first year of the new millennium; and to celebrate the millennium, we plan not only to build new bridges between areas traditionally represented at the conference but also to launch new areas of interest within WSC. WSC '00 will formally commence with the Ph.D.-student colloquium and the poster session, followed by an array of tutorial, methodology, application, and hot-topic tracks.

The hot-topic tracks will include: future of simulation; web-based and Java-based simulation; construction engineering and project management; verification, validation, and accreditation; 3D and real-time simulation; and agent-based modelling and simulation.

The conference exhibit area is huge—22,000 square feet; and we are in the process of recruiting many new companies to show their wares alongside WSC's traditional exhibitors. New, larger spaces for exhibits are planned as well as a KidSim area that gives children of all ages the chance to play with modelling and simulation in a specially reserved section of the exhibit area. There will also be a separate SimMedia room that will feature an array of continuously running videos and presentations together with popcorn and snacks for the audience.

Plan for Future WSCs. WSC '01 will be held at the Crystal Gateway Marriott Hotel in Arlington, Virginia. This is an ideal location because of its proximity to Reagan National Airport and downtown Washington, D.C.

With its location in Washington, D.C., the conference will include tracks on governmental and military applications as well as modelling and analysis methodology, manufacturing and logistics applications, and an extensive set of tutorials for both novice and experienced simulation practitioners.

For additional information, contact the WSC '01 General Chair, Matt Rohrer of AutoSimulations (mattr@autosim.com; tel: 801-294-1320) or the WSC '01 Program Chair, Deb Medeiros of Penn State University (djm3@psu.edu ; tel: 814-863-2364).

Conclusion. Further advances in system simulation will require coordinated improvements in education, methodology, and software and hardware development together with innovative, intelligent applications of simulation technology. By providing a common, broadly based forum for the great diversity of professional interests held by the members of its sponsoring organisations, the Winter Simulation Conference will continue to serve as a catalyst for the interactions between simulation professionals in academia, government, and industry that are essential to future progress of the field.

With the preservation and extension of its longstanding traditions, WSC should also provide a model for other conferences that are based on collaboration among several large professional societies.
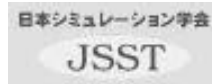
Parts From WSC Homepage. To be continued.

James R. Wilson, Paul A. Fishwick, Keebom Kang
jwilson@eos.ncsu.edu
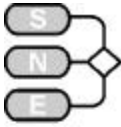
SIMULATION SOCIETIES

JSST

Japan Society for Simualtion Technology

JSST, The Japan Society for Simulation Technology , was established under its present name in 1981.

The JSST is the registered society, recognized by the Science Council of Japan. There are about 700 active members including the corporate and student members. The members of the Society come from both industry and academia, who are not only simulation engineers and scientists for system analysis and modeling, simulation language, process simulation, traffic and environmental simulation, but also those for the numerical or computational simulation.

The JSST provides a forum for the exchange and the dissemination of the information of the widespread topics of simulation technology from hard ware to soft ware, which includes the following activities:

Publications

The JSST publishes the quarterly journal [Simulation], which counts 18th volume this year. It contains the explanation articles and news on the hot topics relating to the simulation technology as well as the reviewed papers of original contribution.

Two proceedings of the Simulation Technology Conference and the Computational Electromagnetics and Electronics Symposium are annually published.

The Society published the three volumes of books for simulation technology from Corona-sha publisher, Tokyo. Now the publication of Computational Electromagnetics and Electronic Engineering Series of 14 volumes is on the way from Morikita-shuppan Publisher, Tokyo.

Seminars and Field Trips

The seminar on a particular topic is regularly held prior to the Symposium. Field trips which are to visit the facilities and sites technically interesting to the members are planned a few times a year.

Exchange of the Information and the Co-operation with Overseas Societies

The JSST has an agreement with EUROSIM to strengthen the relation. The JSST is now a co-operating society for IMACS2000. The JSST has a close contact with KSS (Korean Simulation Society), and CASS (Chinese Association for System Simula-

tion) and the joint-international conferences are planned.

The Society had its first international conference, JSST Conference on Recent Advances in Simulation of Complex System, Tokyo in 1986. The conference was co-sponsored by SCS (The Society for Computer Simulation), IMACS (International Association for Mathematics and Computer in Simulation) and IACM (International Association for Computational Mechanics). The second international conference is planned to be held in Tokyo in the year of 2000.

The JSST is co-sponsoring the national and international conferences and symposia. Under the auspices of the Society, some research committee meetings are regularly operated on the specialized topics which include the accuracy-guaranteed simulation technique and automatic design of the multidimensional mobile information network.

Information

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Tel : +81 (3) 3239-4738
Fax : +81 (3) 3239-4714
URL: http://wwwsoc.nacsis.ac.jp/jsst/

LSS

On September 8-9, 2000 the Latvian Simulation Society was organising, in co-operation with the Riga Technical University, Linköping University, BALTECH University Consortium in Science and Technology, and Baltic Operations Research Society, the Second International Conference "Simulation, Gaming, Training and Business Process Reengineering in Operations".

The conference was hosted by the Riga Technical University. It was devoted to both theoretical and practical aspects of Operational Research and Simulation in the fields of manufacturing, logistics, transportation and services. About a hundred conference participants presented 13 countries, including Latvia, Lithuania, Estonia, Germany, Sweden, Denmark, Russia, USA, Czech Republic, Belgium, UK, Poland and The Netherlands.

There were 84 presentations at the conference, including a tutorial (by Dr. Eugene Kindler from Charles University, Czech Republic), 2 plenary presentations (by Dr. S.K. Banerjee from the University of Strathclyde, United Kingdom and Dr. Edward Williams from Ford Motors Company, USA) and 18 regular

SIMULATION SOCIETIES
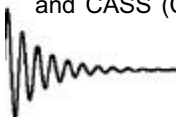
sessions. Two special sessions were devoted to performance of specific projects: Copernicus 1998 project PL976012 DAMAC-HP ("Further Development and Practical Application of Harbour Processes Managing and Controlling Models, Methods and Techniques") of the European Commission, and CONSA ("Competence Network of Simulation Applications") network of competence, financed by the Swedish Institute (Sweden).

A special session was related to activities of the Baltic Operations Research Society (BaltORS). The society was organised at the previous conference in September 1996 in Riga, with the aim to consolidate colleagues from the Baltic countries (Latvia, Lithuania, Estonia), whose professional interests are in the area of operations research and simulation. The session was opened by the society President Prof. Henrikas Pranevicius (Lithuania), who reported about activities performed during the last 2 years. Main tasks for the next period were stated, including intensifying international collaboration with sister organisations. A new BaltORS Board was elected for the next 2-years period, with Prof. Yuri Merkuryev (Latvia) as President.

Conference papers are published in the conference proceedings. For further information please contact the conference General Co-Chair:

Prof. Yuri Merkuryev
Riga Technical University
1, Kalku Street
LV-1658 Riga, Latvia
Tel: +371-7089514
Fax: +371-7089513
E-mail: merkur@itl.rtu.lv

For information about LSS please contact Y. Merkuryev

Y.Merkuryev

YSS

General information

Yugoslav Simulation Society (YSS) was founded in 1998. Main goals of YSS are to gather researchers developing or using simulation tools from any research and development area, to help them express their views, to help them access to other's research results and to try to establish international collaboration of Yugoslav and other simulation societies including the European federation of simulation societies.

News

The YSS was established at the end of 1998, but its real activity was postponed for one year because of unpleasant events which took place in the period from March 24th to June 10th 1999 in Yugoslavia.

Events

Our first serious activity was the realization of the Small System Simulation Symposium - SSSS2000, September 04-05, Faculty of Electronic Engineering,

http://yss.elfak.ni.ac.yu/ssss2000/ which was organized with the Faculty of Electronic Engineering at University of Nis, Yugoslavia. The activities within the symposium where organized in four events: three sessions and a Round Table in the following order:

1. Simulation of microelectronic and microelectromechanical systems
2. Advanced modeling of small systems
3. Simulation and realization of small systems
4. Round Table: Simulation of small systems and the role of SSSS.

Scientists from five West European countries and from Yugoslavia participated to the Symposium. We think that the SSSS2000 was a full success. A confirmation of this statement comes by Elesevier who will publish all (11) papers as a special issue of its "Microelectronics Journal" devoted to SSSS2000.

Participants of International Conference *"Small System Simulation Symposium",* Nis, Yugoslavia, http://yss.elfak.ni.ac.yu/ssss2000/

Contact Address

Yugoslav Simulation Society
Faculty of Electronic Engineering,
University of Nis, Beogradska 14 (Room 322),
18000 Nis, Yugoslavia.
tel: +381.18.529 224, fax: +381.18. 46 180
e-mail: YSS@yss.elfak.ni.ac.yu
WWW: http://yss.elfak.ni.ac.yu/

Prof. Vanco Litovski,
President of YSS

INTERNATIONAL SOCIETIES & USER GROUPS

I M A C S
MATHMOD Conference Series

IMACS - The International Association for Mathematics and Computers in Simulation is an organisation of professionals and scientists concerned with computers, computation and applied mathematics, in particular as they apply to the simulation of systems. This includes numerical analysis, mathematical modelling, approximation theory, computer hardware and software, programming languages and compilers. IMACS also concerns itself with the general philosophy of scientific computation and applied mathematics, and with their impact on society and on interdisciplinary research.

IMACS is one of the international scientific organisations (with IFAC, IFORS, IFIP and IMEKO) represented in FIACC, the five international organisations in the area of computers, automation, instrumentation and the relevant branches of applied mathematics. Of the five, IMACS (which changed its name from AICA in 1976) is the oldest and was founded in 1956.

IMACS organises local and international scientific symposia and conferences, and sponsors publications in its fields of interest.

MATHMOD Conference Series

In February 2000 the 3rd International IMCAS Symposium on Mathematical Modelling took place. These Conference Series was started in February 1994 with the 1st MATHMOD, followed in February 1997 by the 2nd MATHMOD.

The conference 3rd MATHMOD gathered 210 scientist from 25 countries, showing the broad variety of the "art of mathematical modelling" - not only including theoretical mathematical aspects, but also incorporating any kind of application, implementation and software design based on formal or mathematical models.

A detailed conference report of 3rd MATHMOD can be found in SNE 28, p. 39. At the conference website now pictures of the conference can be found, from scientific programs and discussions to social events: http://argesim.tuwien.ac.at/3rdMATHMOD

A review of the conference has shown positive outcome, so that it was decided to follow the recommendation of many participants: to continue these conference series.

At present we are preparing an organising committee for the next conference in these series:

4th MATHMOD Vienna, Feburary 2003

http://argesim.tuwien.ac.at/4thMATHMOD
Inge.Troch@tuwien.ac.at

Inge Troch
Inge.Troch@tuwien.ac.at

SIGSIM
General Information

The ACM Special Interest Group for Simulation (SIGSIM) is an international professional organization in the area of modeling and computer simulation. The organization's members represent an extremely cross-disciplinary set of professions where modeling and simulation are applied. SIGSIM is actively involved in promoting technical advances in the field and supporting educational activities that expand the use of M&S in engineering, scientific, and management fields.

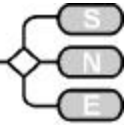### SIGSIM sponsors four publications / conferences
Simulation Digest

This is the primary newsletter of SIGSIM. It contains technical articles as well as information about SIGSIM, calls for papers, calendar of events and other announcements.

Parallel And Distributed Simulation Conference

This is a premier conference on parallel and distributed simulation. Historically, the focus has been on parallel simulation where high performance is of concern. Recently, papers on distributed simulation for training and analysis have begun to appear.

Winter Simulation Conference

This is a premier conference on all aspects of simulation. It consists of several tracks covering modeling methodology, manufacturing applications, military simulations, parallel and distributed simulations, general applications, etc.

Annual Simulation Symposium

This symposium deals with different aspects of simulation

SIGSIM maintains a web page at http://www.acm.org/sigsim/ where current news, links to conferences, electronic publications, and special activities are maintained. SIGSIM also sponsors a mailing list for simulation professionals which is open to all interested parties. Instructions for subscribing to the mailing list are available on the web page.

Special Activities

SIGSIM has created a Web-Based Distinguished Lectureship Series. This consists of audio and video recordings of presentations by and interviews with some of the most prominent people in the field. The multimedia presentations will be accessible to SIGSIM members via the web page listed above.

Contact Addresses

Ernest Page, SIGSIM Chair
MITRE Corporation
7525 Colshire Drive
McLean, Virginia 22102 USA
epage@mitre.org

Membership

SIGSIM has approximately 600 members distributed among 50 countries around the world. Annual membership fees are $22 when accompanied by membership in ACM. Members receive the CD-ROM version of the Proceedings of the Winter Simulation Conference, the paper version of the Proceedings of the Parallel and Distributed Simulation Workshop, registration discounts on SIGSIM sponsored conferences, and access to the Distinguished Lectureship Series on the SIGSIM Web page. Additional membership information is available from:

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108 Cowley Road
Oxford, OX4 1JF, UK
+44-1865-382-338
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http://www.acm.org/sigsim/

Roger Smith

INFORMS

The College on Simulation is a section of INFORMS, the Institute for Operations Research and the Management Sciences (http://www.informs.org/).

The College on Simulation is organized and operated exclusively for educational and scientific purposes:

a.) to encourage the development and dissemination of knowledge in the area of simulation; and
b.) to promote communication and interaction among individuals and organisations who share an interest in simulation.

Distinguished Service Award

Amongst other activities, INFORMS has established awards for outstanding simulationists.

To recognise individuals who have provided long-standing, exceptional service to the simulation community, the Institute for Operations Research and the Management Sciences (INFORMS) College on Simulation has established its Distinguished Service Award, which may be given to at most one person annually. Sustained service to the simulation community should extend over a period of 15 to 20 years or longer and be acquitted with distinction.

The winner of 1999 is weel-known Jerry Banks (report see elsewhere in this journal).

Membership

Membership in the College on Simulation is independent of membership in The Institute for Operations Research and the Management Sciences. The annual membership fee for non-INFORMS members is $20.00; INFORMS members may join for $10.00. The fee for students and retired members is $5.00.
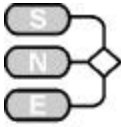
To join, send name, address, and e-mail address (if applicable), with the appropriate fee, to:

Susan M. Sanchez (Vice President)
Operations Research Dept,
Glasgow Hall
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Monterey, CA 93943, USA
SSanchez@nps.navy.mil
http://diana.or.nps.navy.mil/~susan

Info: http://www.informs-cs.org/

IEMSS

The International Environmental Modelling and Software Society (IEMSS) was formed in June 2000 with the aims of developing environmental modelling and software tools to advance science and improve decision making in resource and environmental issues and to promote contact among physical, natural and social scientists, economists and software developers from different countries. This Society places an emphasis on interdisciplinarity and will form an umbrella for contact between different regional groups, including Multi-Objective Decision Support Systems (MODSS), Binding Environmental Sciences and Artificial Intelligence (BESAI), the Modelling and Simulation Society of Australia and New Zealand (MSSANZ) and the International Symposium on Environmental Software Systems (ISESS), and is linked to the Environmental Modelling and Software (EMS) Journal.

The Society's webpages (www.iemss.org) host a number of online resources including a software and model repository for the Journal, an online discussion area and links to environmental modelling and software resources.

> **IEMSS2002**, the inaugural meeting of the Society, is being organised for 24-27 June 2002 in Lugano, Switzerland. The themes of this conference are:

- Integrated assessment frameworks and case studies, in particular, Integrated Water Assessment and Integrated Urban Planning Assessment
- Multiobjective decision support
- Innovative software engineering for model integration and re-use
- Advances in model approaches, uncertainty modelling, and testing
- Scale issues in modelling
- Participatory Integrated Modelling, stakeholder issues in modelling and decision support
- Environmental applications of models and software
- Applications of agent-based modelling and simulation to environmental systems

The deadline for abstracts is 30 October 2001 and for full papers is 28 February 2002. Further details on the conference can be found on the IEMSS2002 web site, www.iemss.org/iemss2002 or by contacting Dr Andrea Rizzoli, Istituto Dalle Molle di Studi sull'Intelligenza Artificiale (IDSIA), Manno, Switzerland, +41-(0)91-6108664, andrea@idsia.ch

Membership of the Society is US$20. Membership forms can be found on the website, www.iemss.org, or can be obtained by:

Contact

Rebecca Letcher,
Centre for Resource and Environmental Studies, Australian National University,
Canberra Australia,
Tel. +61-2-6279 8132,
rebecca@cres.anu.edu.au.

CRESS

Centre for Research on Simulation in the Social

CRESS, the Centre for Research on Simulation in the Social Sciences aims to support the use of simulation by social scientists. It draws together and promote current research on the application and benefits of simulation methods across the social sciences.

CRESS is located in the Department of Sociology, School of Human Sciences, University of Surrey, Guildford, England.

Activities

CRESS is organising and supporting the following activities in order to achieve this aim:

Web site and email distribution list

To encourage the distribution of information about simulation, an email distribution list has been established. To join, send a message to mailbase@mailbase.ac.uk containing the line: join simsoc First-name Surname substituting your own name. A Web site with links to sites related to social simulation around the world has been created.

Website Computer Simulation of Societies

http://www.soc.surrey.ac.uk/research/simsoc/simsoc.html

This site is maintained by CRESS - the Centre for Research on Simulation in the Social Sciences - to provide a library of links related to social simulation around the world.

Journal of Artificial Societies and Social Simulation

http://www.soc.surrey.ac.uk/JASSS/

The Journal of Artificial Societies and Social Simulation (JASSS) is the premier journal in the field of social simulation and is edited from the Centre.
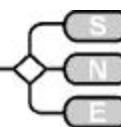
Reviews of the potential of simulation in selected areas of the social sciences

A set of reviews of existing work involving simulation in sociology, political science, technological innovation, and business processes was commissioned. They have been published in a special issue of the American Behavioural Scientist in 1999:

Nigel Gilbert (ed.) Computer Simulation in the Social Sciences. Special issue of the American Behavioral Scientist, volume 42, number 10. Thousand Oaks: Sage.

Short courses on simulation in the social sciences

Courses introducing the main approaches to simulation are offered at intervals, either at the University of Surrey or elsewhere. The next course, in conjunction with the University of Koblenz-Landau and the European Union, will be held 11-15 September, 2000 in Koblenz, Germany. Contact the Centre for details or see the course web page.

Simulation for the Social Scientist

http://www.soc.surrey.ac.uk/research/simsoc/sss/code.html

A textbook, Simulation for the Social Scientist, (Nigel Gilbert and Klaus G. Troitzsch, published by Open University Press, 1999) outlines all the common approaches to simulation at a level of detail that gives social scientists an appreciation of the literature and allows those with some programming skills to create their own simulations.

Advice and consultancy

The Centre is able to offer a limited amount of advice about the use of simulation in social science research. It can also act as a 'broker' putting those who might be able to offer advice or (paid) technical assistance in touch with those who need it. Contact the Centre if you are offering or needing such services.

Other activities

Let us know if there are other activities which would help promote the use of social simulation in your field.

CRESS research

1. A distributed artificial intelligence simulation of budgetary decision making, funded by the Economic and Social Research Council, 1994-7 (with Edmund Chattoe) The project aimed to understand more about how people manage their money by interviewing them about how their budgeting and

building a simulation model which represents a formalisation of what they tell us.

2. IMAGES: Improving agri-environmental policies : a simulation approach to the role of the cognitive properties of farmers and institutions, funded by the FAIR programme of the Commission of the European Communities, 1997-2000 (with Edmund Chattoe) This collaborative project with partners in France and Italy is studying the factors which influence farmers in deciding whether to adopt environmental improvements and building a simulation which will help policy-makers formulate more effective environmental improvement programmes.

3. Teaching simulation in Economics and Social Science, funded by the European Union under the TACIS programme, 1997-8. This project helped researchers from the Ukraine, Germany and CRESS to meet together and develop courses on simulation in social science.

4. Self-organisation of the European Information Society, funded by the Targeted Socio-Economic Research (TSER) programme of the Commission of the European Communities, 1998 - 2000 (with Simon Dresner). This collaborative project with partners in the Netherlands, Germany, Switzerland, and Italy is exploring the dynamics of the emergent information society.

5. Simulating self-organizing innovation networks, funded by the Targeted Socio-Economic Research Programme of the Commission of the European Communities, 1999 - 2001 (with Janet Vaux).

6. Freshwater Integrated Rsource Management with Agents (FIRMA), funded by the Environment programme of the Commission of the European Communities, 2000 - 2003.

CRESS information
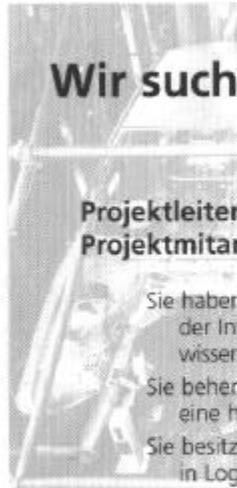
Nigel Gilbert is Director of CRESS.

CRESS is located at

*Department of Sociology,
School of Human Sciences,
University of Surrey,
Guildford GU2 5XH,
United Kingdom.
Tel: + 44 (0) 1 483 259460
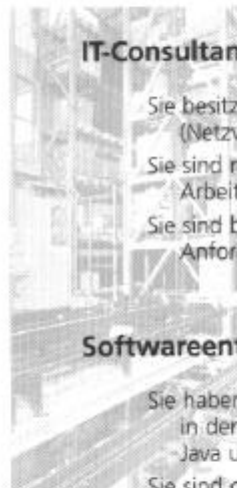Fax: + 44 (0) 1 483 259551
Email: cress@soc.surrey.ac.uk.
http://www.soc.surrey.ac.uk/research/cress*

MSSANZ

Modelling and Simulation Society of Australia and New Zealand Inc.

Purpose. The Modelling and Simulation Society of Australia and New Zealand Inc. (MSSANZ), formerly the Modelling and Simulation Society of Australia (MSSA), and the Simulation Society of Australia Inc. (SSA), is an affiliate of the International Association for Mathematics and Computers in Simulation (IMACS), and the Society for Computer Simulation (SCS).

The aims of the Society are to promote, develop and assist in the study of all areas of modelling and simulation.

The Society has more than 500 members from 50 countries, including Australia, Canada, China, France, Germany, Japan, New Zealand, the Netherlands, South Africa, Spain, Switzerland, the United Kingdom and the United States. Members are from a wide range of professional disciplines including hydrology, agricultural science, economics, engineering, atmospheric science, ecology and many others.

MSSANZ encourages students through regular student prizes and by subsidising their registrations at conferences.

Scientific Meeting. About every two years, the Society organises a major international conference. MODSIM 2001, the next MSSANZ International Congress on Modelling and Simulation, will be held in Canberra, 10-13 December 2001.

Newsletter / Journal Publications. As a means of communication among members, the Society publishes one or two newsletters per annum.

At each biennial conference the best papers are selected for publication in several leading journals.

Membership. Membership fee of the Society is AUS$22 (which includes 10% GST) for 2 years. Members receive a AUS$50 reduction in their Registration fee at the next Biennial Conference and do not pay a membership fee for the next two years.

Awards. The Society awards Biennial Medals, Fellowships and Student Prizes in each of the following three categories: Natural Systems, Socioeconomic Systems and General Systems.

Medals go to outstanding contributors to modelling and simulation over a sustained period. Medallists automatically become Fellows of the Society.

Fellows are recognised for their unselfish dedication to the aims of the Society as well as for their contributions to modelling and simulation.

Students presenting the best papers at Biennial Conferences in the three categories are awarded a cash prize and a Commendation Certificate.

As from 2001 the Society will also be granting Early Career Research Excellence (ECRE) Awards in each of the three categories (for further information see July 2000 Newsletter).

Info

http://cres.anu.edu.au/~tony/mssanz.htm
Anthony Jakeman, tony@cres.anu.edu.au,
David White dwhite@acslink.aone.net.au

MODSIM 2001 - International Congress on Modelling and Simulation: Date: December 10-13, 2001 Place: Australian National University, Canberra, Australia

Theme: Integrating Models for Natural Resources Management across Disciplines, Issues and Scales

Topics within the theme of the Congress include:

Water resources, oceanography, climate, atmosphere, global change, ecology, agriculture, forestry, fishery, socio-economic systems, demography, business, tourism, econometrics, economics, statistics, risk and uncertainty, information systems, decision support systems, industrial and operation research, medical research, public health and epidemiology, and general aspects of modelling and simulation.

Deadlines: Abstracts (300 words) by February 2001; acceptance of the abstracts by 30 March 2001; final papers (6 × A4) by 31 July 2001.

For further information contact

Dr Fred Ghassemi
C/- Centre for Resource and Environmental Studies,
The Australian National University,
Canberra ACT 0200 Australia
Email: fredg@cres.anu.edu.au
http://cres.anu.edu.au/~tony/modsim2001.htm

INDUSTRY NEWS

The Mathworks expands presence in Europe

NATICK, MA. August, 2000 - The MathWorks, developer of MATLAB and Simulink technical computing software, announced it has dramatically expanded its direct sales and operations presence in Europe and has introduced consulting operations in Europe and the U.S. The company has acquired the operations of several long-time MathWorks distributors in France, Germany, Switzerland, and Benelux.
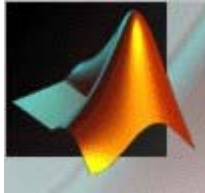
In Germany The MathWorks has just taken over Scientific Computers' MATLAB related business units, including its staff, in Aachen, Munich and Bern. As a consequence, the newly formed company, The MathWorks GmbH, will be serving the German, Austrian and Swiss markets. The MathWorks GmbH is in the same locations that Scientific Computers has been operating from for the last years. Earlier this year, The MathWorks established a new office in Spain.

To significantly increase its consulting resources in Europe, The MathWorks acquired Auxilio, a firm that specializes in providing consulting services related to MathWorks products. The previously acquired Cambridge Control Ltd. sales and a consulting firm will now operate as The MathWorks UK, bringing the total number of MathWorks employees to ovwer 700 worldwide.

The new MathWorks-owned offices put the company in direct touch with our European customers through experienced local technical and sales staff, said Jack Little, president and CEO of The MathWorks. We expect that increased personnel and financial resources will build on the solid foundation our distributors have created. We're also very pleased to now have a 50-person consulting staff available to develop custom software solutions for customers throughout Europe.

The timing of this change is significant, Little continued. Users of MATLAB and Simulink are creating advanced real-time technology that requires increasing support in a wide range of fields and industries. The expertise in these offices in applications such as control system design and DSP design will be an important resource for our customers in Europe.

In a related move, The MathWorks recently opened a consulting services and sales office in Novi, MI to serve customers in the U.S. automotive industry.

The Mathworks Germany, Friedlandstr. 18, D- 52064 Aachen, Tel: +49-241-47075-0, Fax: +49-241-47075-12 or Siedlerstr. 2, D- 85774 Unterföhring / München, Tel.: +49-89- 995901-0, Fax: +49-89- 995901-11
www.mathworks.de
www.mathworks.com

ESL 7.0 released

***ESL 7.0**. The new version includes the following improvements:*

1. double precision for C++ translated programs offering greater accuracy
2. option to use Microsoft Visual C++ or Salford Software C++ compiler
3. ability to run remote segments on the PC version
4. ESL plot statements restored
5. improved appearance of ISE
6. display manager now offers all the functionality of the old DISP program
7. on-line user manual
8. improved speed of run-time and post-run plots
9. more options on Simulation Execution
10. most of the known bugs fixed
11. runs under Windows 95/98/NT/2000 and Sun Solaris 2

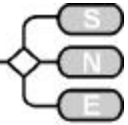You can find more information about ***ESL 7.0*** on the Cogsys website: http://www.cogsys.com

John Pearce, ISIM International Simulation Limited, 26/28 Leslie Hough Way, Salford M6 6AJ, Tel: +44 (0)161 745 7604, Fax: +44 (0)161 736 2634, e-mail johnp@cogsys.com

New Power for dSPACE Systems

dSPACE Presents the DS 1005 PPC Processor Board for Highly Complex Real-Time Applications

dSPACE is offering the new DS1005 PPC Processor Board as the new heart of its development systems for designing and testing mechatronic control systems.

These systems are used for hardware-in-the-loop simulation, for example, or to develop functions for electronic control units. For such processor-intensive applications, the Paderborn engineers are using a Motorola Power PC with 480MHz. Used in conjunction

with appropriate I/O, this gives users a powerful turn-key system with the greatest possible computing performance.

The DS1005 PPC Board is also a great team player. Enormous as its computing power already is, it can be increased even further by running any desired number of processor boards in parallel. Thus development systems can be tailored to meet customer's individual requirements.

Functions are designed from within the familiar Windows environment, by the development tools MATLAB, Simulink and Stateflow from The Mathworks Inc. dSPACE supplies special Simulink blocks for the new board; these connect the development software to the hardware.

Functions that have been specified in graphical form can be downloaded to the dSPACE system at the touch of a button. The necessary code is generated automatically. No manual programming is needed in order to implement new functions. The control, analysis and visualization of the experiment are performed by ControlDesk, the software from dSPACE.

The I/O is connected via a 32-bit I/O bus. A total of 256 I/O channels is available. No matter what I/O functionality is required, the DS1005 can be connected to all dSPACE I/O boards. For example, these may be cards for A/D and D/A conversion, for signal generation and capture, or for highly dynamic measurement tasks.

The DS1005 PPC Processor Board is available as of now.

dSPACE GmbH Technologiepark 25
33100 Paderborn
Tel.: ++49-5251-1638-0
Fax: ++49-5251-66529
Sales: info@dspace.de
Support: support@dspace.de
WWW: http://www.dspace.de

BaseSIM v 1.0 download

solutionsBase Ltd is the developer of the discrete event simulation software, baseSim. baseSim v.1.0 is now available as a FREE download from our website, in the form of components for the Borland Delphi RAD software.

Description: baseSim Simulation Components form an Object-Oriented Suite of Borland Delphi Components which can be used to build Simulation Models and Simulation Applications. baseSim fea-

tures: Easy to use and to develop - Rapid 'Drag and Drop' development - Ability to build complex, flexible and standalone Models - High speed, fully compiled execution - Close integration to Delphi (e.g. Design-time and Run-time Component Editors) - Model Hierarchy - Multi-threaded Event Controller - Statistical Distributions for model experimentation - Graphical Statistical Distribution Editor - Disruptions and Failures - Blocking behaviour - Flow Decision Control - Automatic Statistics Collection - Animation of Material Flow and Movable Objects - Graphical Connector Lines between Objects - Smooth Scrolling and Zooming of Simulation Forms - Model Object Browser - Model Integrity Checker - Data Tables, Stacks and Queues - Integrated Help (Design-time and Run-time) - On-line Technical Support.

baseSim version 1.x has been released completely FREE of charge. That means that there is no charge for the software, no charge for licensing and no charge for deployment. solutionsBase Ltd. charges for other ancillary services such as training, consultancy and bespoke model building.

Web Site: http://www.solutionsbase.co.uk
E-mail: info@solutionsbase.co.uk

EcosimPro released

EcosimPro is a dynamic simulation tool for modelling Differential-Algebraic, ordinary differential equations and discrete events. It can be used to study both steady states and transients. It has been used for modelling Fluids, Chemistry, Electrical, ECLSS, etc. Currently ESA, NASA and other companies are using EcosimPro for modelling systems on the International Space Station.
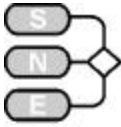
http://www.ecosimpro.com.

They contain a lot of information about libraries, applications, examples, etc. with EcosimPro. It contains also useful links to Simulation organisations, simulation mathematics, etc. Also it provides information about recommended books. More references will be included in the future.

A demo version is available.

Regards

Pedro Cobas, EA International,
Magallanes 3, E-28015 Madrid
Tel: ++34-91-3098150,
Fax: ++34-91-5912655
Email: pce@empre.es
WWW: http://www.ecosimpro.com

EDITORIAL BOARD & SUBSCRIPTION

ARGESIM SERVICE - SNE SUBSCRIPTION

ARGE Simulation News (ARGESIM) is a non-profit working group disseminating information on simulation, organising activities in the area of modelling and simulation (e.g. courses, comparative studies), publishing journals and books in this area, and providing the infrastructure for the administration of EUROSIM and ASIM activities.

ARGESIM works at three levels:

- European and International Activities: Journal SNE (editing and publishing; printing and WWW - publication), ARGESIM Comparisons on Simulation Technique and Simulation Software, Publication of Books, EUROSIM WWW - Server, Calendar of Simulation Conferences, List of Simulation Hotlinks

- Regional Activities: publication of ASIM-Nachrichten and User Group Newsletters, administration for ASIM and for User Groups, ASIM WWW - Server, WWW - servers for Austrian Research Centres (medinet.org, etcanet.org)

- Local Activities: seminars "Modelling and Simulation", simulation software support at Vienna University of Technology, various simulation projects

ARGESIM's webserver is at present re-organised, especially the service for the cal-endar of simulation conferences and for the simulation hotlink list is improved (see webpage figure).

Simulation News Europe is sent to most members of the simulation societies in EU-ROSIM, to the European SCS members and to User Groups, etc. A personal subscription for SNE is also offered - see subscription from at the right, or contact:

http://www.argesim.org/sne/subscribe

ARGESIM Simulation Links

Societies, Organizations

EUROSIM, Links to all European Simulation Societies and co-operating societies
SCS Europe
SCS USA
INFORMS College on Simulation
SIE-WG-8467, Simulation in Europe (EU)
SIWG (Simulation Interoperability Working Group)
ACM Special Interest Group on Simulation

General

Survey of discrete-event simulation software
Simulation Archive
Simulation Education Homepage
SimCentral (the Modeling and Simulation Information

SNE - Subscription - Back Issues

http://www.argesim.org/sne/subscribe

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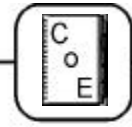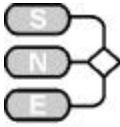
CALENDAR OF EVENTS

November 2000

27-01 **MCQMC 2000**. FOURTH INTERNATIONAL CONFERENCE ON MONTE CARLO AND QUASI-MONTE CARLO METHODS, HONG KONG
Contact: mcqmc2000@www.mcqmc.org,
http://www.mcqmc.org/MCQMC2000.html

29-30 **SIMOUEST**. Marine Technology. Industry & Simulation, Nantes, France
Contact: Delphine Lefeuvre, SITIA,, 1, rue de la Noe, BP 32104 F-44321, Nantes Cedex, Tel.: +33-2-40 37 51 37, Fax: +33-2-40 37 03 35, sitia@sitia.ec-nantes.fr, http://www.simouest.com/

December 2000

10-13 **WSC '00**. Winter Simulation Conference, Orlando, Florida
Contact: http://www.wintersim.org

11-12 **8th Bellman Continuum**. Int. Workshop on Intelligent Systems Resolution, Hsinchu, Taiwan, ROC
Contact: hfwang@ie.nthu.edu.tw,
http://140.114.54.175/~hfwang/BELLMAN/

15-15 **ISCS 2000**. Annual Conference o f the Italian Society for Computer Simulation, Lecce, Italy
Contact: antonio.grieco@unile.it,
http://lesim1.ing.unisannio.it/iscs/main_page.htm

January 2001

07-11 **WMC'01**. Western MultiConference on Computer Simulation, Phoenix, Arizona, USA
Contact: cellier@ece.arizona.edu, http://www.scs.org

08-11 **ICSHS 2001**. International Conference on Health Sciences Simulation, Phoenix, Arizona, USA
Contact:Andersonj@sri.soc.purdue.edu,
http://www.sla.purdue.edu/academic/soc/andersonj/call.html

February 2001

11-15 **NNA'01**. Neural Netorks and Applications '01, Puerto De La Cruz, Tenerife
Contact: http://www.worldses.org/wses/nna

11-15 **FSFS '01**. Fuzzy Sets and Fuzzy Systems, Puerto De La Cruz, Tenerife
Contact: http://www.worldses.org/wses/fsfs

11-15 **EC '01**. Evolutionary Computation '01, Puerto De La Cruz, Tenerife
Contact: http://www.worldses.org/wses/ec

19-22 **MIC 2001**. Twentieth IASTED International Conference MODELLING, IDENTIFICATION AND CONTROL, Innsbruck, Austria
Contact:
http://www.iasted.com/conferences/2001/austria/mic.htm

March 2001

05-06 **ASIM-GMMS 2001**. ASIM-Workshop "Modellierung und Simulation Technischer Systeme", Dresden, Germany
Contact: info@asim-gi.org, http://www.gmms.asim-gi.org

08-08 Workshop "Simulation - Reif für den Mittelstand", Ulm, Germany
Contact: www.scherr-klimke.de/logistik/aktuelles

22-23 **SIMVIS 2001**. Simulation und Visualisierung 2001, Magdeburg, Germany
Contact: organisation@tagung.simvis.org,
http://www.simvis.org/tagungs2001

28-30 **UKSim 2001**. Fifth United Kingdom Simulation Society Conference, Emmanuel College, Cambridge, England
Contact: dad@doc.ntu.ac.uk,
http://ducati.doc.ntu.ac.uk/uksim/uksim'01/CFP-uksim'01.htm

April 2001

02-06 **TACAS 2001**. Tools and Algorithms for the Construction and Analysis of Systems, Genova, Italy
Contact: http://www.disi.unige.it/etaps2001/

02-04 **Agents 2001**. 2nd Intl. Workshop on Agent Based Simulation, Passau, Germany
Contact: Rainer Rimane, Universität Erlangen, Informatik 10, Cauerstr. 6, D-91058, Erlangen, rimane@cs.fau.de, http://www.or.uni-passau.de/workshop2001/

18-20 **EUROMEDIA 2000**. Conferences WEBTEC-MEDIATEC-COMTEC-APTEC-ETEC, Valencia, Spain
Contact: http://hobbes.rug.ac.be/~scs/conf/euromd2001/

18-20 **ECEC 2001**. European Concurrent Engineering Conference 2001, Valencia, Spain
Contact: http://hobbes.rug.ac.be/~scs/conf/index.html

22-26 **ASTC 2001**. Advanced Simulation Technologies Conference, Seattle, Washington
Contact: tentner@anl.gov, http://www.scs.org

22-26 34th Annual Simulation Symposium, Seattle, Washington, USA
Contact: http://agent.csd.auth.gr/ANNSS34/

23-25 **HPCN Europe 2001**. High Performance Computing and Networking in Europe, Amsterdam, Netherlands
Contact: hollenberg@sara.nl,
http://www.wins.uva.nl/events/HPCN2001/

25-27 **MOSIM'01**. Modelling and Simulation "Industrial systems design, analysis and management
Troyes, France,
http://www.univ-troyes.fr/mosim01/,
Amsterdam, Netherlands
Contact: hollenberg@sara.nl,
http://www.wins.uva.nl/events/HPCN2001/

25-27 **EKA 2001**. Engineering Komplexer Automatisierungssysteme, Braunschweig, Germany
Contact: eka@ifra.ing.tu-bs.de, http://www.ifra.ing.tu-bs.de/eka2001

May 2001

15-18 15th Workshop on Parallel and Sistributed Simulation, Lake Arrowhead, California, USA
Contact: deelman@cs.ucla.edu,
http://www.ececs.uc.edu/~paw/pads2001/

28-31 **SimTecT 2001**. Simulation Conference and Exhibition, Canberra, Australia
Contact: http://www.siaa.asn.au/simtect/2001/2001.htm

28-30 **ICCS 2001**. International Conference on Computational Science, San Francisco, USA
Contact: iccs2001@csres.cs.rdg.ac.uk,
www.hpcc.rdg.ac.uk/iccs

CALENDAR OF EVENTS
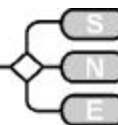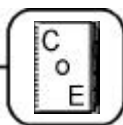
June 2001

07-09 **ESM '2001**. 15th European Simulation Multiconference, Prague, Czech Republic
Contact: http://hobbes.rug.ac.be/~scs/

17-21 **SIM 2001**. Trade Fair and Conferences "International Knowledge Exchange in Applied Simulation and Visualisation", Freiburg im Breisgau, Germany
Contact: loeffler@sim2001.com, http://www.sim2001.com

17-21 **WUA-CFD 2001**. World Fluid Dynamics Days, Freiburg im Breisgau, Germany
Contact: loeffler@sim2001.com, www.sim2001.com

18-23 Fourth St. Petersburg Workshop on Simulation, St. Petersburg, Russia
Contact: http://vega.math.spbu.ru/workshop/2001/

19-22 **ITI 2001**. 23rd Int. Conference Information Technology Interfaces, Pula, Croatia
Contact: Conference Secretariat ITI 2001, University Computing Centre, Josipa Marohnica bb, HR-10000, Zagreb, Croatia, Tel.: +385-1-616 55 97, Fax: +385-1-616 55 91, iti@srce.hr, http://www.srce.hr/iti/

25-27 **ESIW 2001**. 2001 European Simulation Interoperability Workshop, Univ. of Westminster, Harrow, UK
Contact: http://www.sisostds.org/siw/01Euro/index.htm

25-29 **Petri Nets 2001**. 22nd Int. Conf. On Application and Theory of Petri Nets, Newcastle upon Tyne, UK
Contact: http://www.cs.ncl.ac.uk/conferences/2001/pn/

25-29 **ICACSD 2001**. International Conference on Application of Concurrency to System Design, Newcastle upon Tyne, UK
Contact: http://www.cs.ncl.ac.uk/conferences/2001/acsd/

26-29 **BioMedSim'01 / EUROSIM 2001**. Biomedical Simulation / in EUROSIM 2001, Delft, The Netherlands
Contact: hamam@esiee.fr, http://www.esiee.fr/~hamamy

26-29 **EUROSIM 2001**. 4th International EUROSIM Congress, Delft, The Netherlands
Contact: Mrs. T. Tijanova, Delft University of Technology, Faculty of Information Technology and Systems, P.O. Box 5031 NL-2600 GA, Delft, Fax: +31-15-2787209, eurosim2001@pa.twi.tudelft.nl, http://ta.twi.tudelft.nl/PA/Eurosim2001/

03-10 **MODELLING 2001**. 2nd IMACS Conference on Mathematical Modelling and Computational Methods in Mechanics, Physics and Geodynamics, Pilsen, Czech Republik
Contact: mika@kma.zcu.cz

July 2001

15-19 **SPECTS 2001**. 2001 International Symposium on Performance Evaluation of Computer and Telecommunication Systems, Orlando, Florida, USA
Contact: hschmidt@scs.org, http://www.scs.org/confernc/spects01/spects01cfp.html

September 2001

10-14 **MCM 2001**. 3rd IMACS SEMINAR ON MONTE CARLO METHODS, Salzburg, Austria
Contact: mcm2001@cosy.sbg.ac.at, http://mcm2001.sbg.ac.at

11-14 **ASIM 2001**. 15. ASIM Symposium Simulationstechnik, Paderborn, Germany
Contact: Prof. Dr.-Ing. F. Dörrscheidt, Universität Paderborn, FB Elektrotechnik und Informationstechnik,, Pohlweg 47-49, D-33098, Paderborn, Tel.: +49-5251-603003, Fax: +49-5251-603432, asim2001@rt.upb.de, http://www-rt.upb.de/ASIM2001/

17-18 **SIMS 2001**. SIMS Conference 2001, Porsgrunn / Oslo, Norway
Contact: Bernt.Lie@hit.no, http://www.ida.liu.se/~pelab/sims

October 2001

ESS 2001. European Simulation Symposium 2001, Marseille, France
Contact: http://hobbes.rug.ac.be/~scs/conf/index.html

December 2001

10-13 **MODSIM 2001**. International Congress on Modelling and Simulation, Australian National University, Canberra
Contact: fredg@cres.anu.edu.au, http://cres.anu.edu.au/~tony/modsim2001.htm

March 2002

11-13 **ASIM-SBW 2002**. 8. Symposium "Simulation als betriebliche Entscheidungshilfe", Braunlage, Harz, Germany
Contact: info@asim-gi.org, http://www.asim-gi.org

ASIM - SPL 2002. 10. ASIM-Fachtagung Simulation in Produktion und Logistik", Berlin, Germany
Contact: info@asim-gi.org, http://www.spl.asim-gi.org

April 2002

11-13 **ASIM-SMBO 2002**. ASIM Workshop "Simulation in Medizin, Biologie und Ökologie" - 9. Ebernburger Gespräch, Ebernburg / Bad Münster, Germany
Contact: dietmar.moeller@informatik.uni-hamburg.de, http://www.informatik.uni-hamburg.de/TIS/

June 2002

24-27 **IEMSS 2002**. International Environmental Modelling and Software 2002, Lugano, Switzerland
Contact: andrea@idsia.ch, http://www.iemss.org/iemss2002

ESM 2002. European Simulation Multiconference 2002, Nottingham. UK
Contact: http://hobbes.rug.ac.be/~scs/conf/index.html

EUROMEDIA 2002., Modena, Italy
Contact: http://hobbes.rug.ac.be/~scs/conf/index.html

ECEC 2002. European Concurrent Engineering Conference 2002, Modena, Italy
Contact: http://hobbes.rug.ac.be/~scs/conf/index.html

September 2002

ASIM 2002. 16. ASIM - Symposium Simulationstechnik, Rostock, Germany
Contact: info@asim-gi.org, http://www.asim-gi.org

October 2002

ESS 2002. European Simulation Symposium 2002, Dresden, Germany
Contact: http://hobbes.rug.ac.be/~scs/conf/index.html

COMPARISONS OF SIMULATION TOOLS AND SIMULATION TECHNIQUES

Definition and development of ARGESIM-Comparisons

Simulation News Europe (SNE) publishes a series on comparisons of simulation technique and simulation software. Based on simple, easily comprehensible models different modelling techniques and their implementation as well as features of modelling and experimentation within simulation languages, also with respect to an application area, are compared.

Definitions

Up to now 12 comparisons have been defined.

- **C1 Lithium-Cluster Dynamics under Electron Bombardment**, SNE 0 (11/90), checks features for integration of stiff systems, for parameter variation, and for steady state calculation.
- **C2 Flexible Assembly System**, SNE 2 (3/91), for discrete simulators, compares features for sub-model structures, control strategies, and optimisation.
- **C3 Generalised Class-E Amplifier**, SNE 2 (7/91), focuses on simulation of electronic circuits, requiring table functions, eigenvalue analysis, and complex experiments.
- **C4 Dining Philosophers I**, SNE 3 (11/91), is more general involving not only simulation but also analysis e.g. by Petri nets and, etc.
- **C5 Two State Model**, SNE 4 (3/92), primarily addresses simulation tools with very high accuracy (checking integration and state event handling).
- **C6 Emergency Department - Follow-up Treatment**, SNE 6 (11/92), addresses discrete simulators and tests features for modelling, concepts of availability, and complex control strategies.
- **C7 Constrained Pendulum**, SNE 7 (3/93), checks features for hybrid modelling, comparison of models, state events, and boundary value problems.
- **CP1 Parallel Simulation Techniques**, SNE 10, (3/94), deals with the benefits of distributed and parallel computation for simulation tasks. Three test examples investigate parallelisation techniques.
- **C8 Canal-and-Lock System**, SNE 16 (3/96), checks features for modelling complex logic control, validation of discrete models, and variance reduction.

- **C9 Fuzzy Control of a Two Tank System**, SNE 17, (7/96), asks for approaches and for implementations of modules for fuzzy control.
- **C10 Dining Philosophers II**, SNE 18 (11/96), reviews discrete simulators with respect to simultaneous (concurrent) access to resources and with deadlocks.
- **C11 SCARA Robot**, SNE 22 (3/98), deals with implicit and hybrid systems with state events.
- **C12 Collision of Spheres**, SNE 27, November 1999, allows numerical or analytical analysis as well as continuous or discrete approaches

For 2001 two new comparisons are in preparation:

C13 Crane Crab with Embedded Control, will on the one side address techniques and features for digital control as "common" comparison, and will on the other side compare VHDL-AMS - approaches and implementations as "special" comparison

C14 Computer Communication, will check modelling and simulation at various OSI - layers.

Solutions

We invite all readers to participate in this comparison. Please, simulate the model(s) with any tool of your choice and send in a solution.

A solution should consists of: 1. a short description of the simulator, 2, modelling technique, model description, 3. results of the three tasks
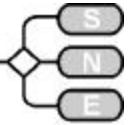
Additionally we ask for: 1. suggestion for classification, 2. model codes, if available

The solution should fit into one page of SNE - templates and already published solutions can be found at the web. Solutions sent in are reviewed with respect to completeness of tasks and comparability. Source codes of model and / or experiment description are highly appreciated: they are also put on the web, so that readers can experiment with the models, if they have the specific simulator available.

Evaluation and Classification of Solutions

In 1998 an evaluation and classification of solutions sent in was started. End of 2000 the results will available at the web, so that one the one side new solutions can be classified more exactly, and that on the other side new approaches or techniques for a new solution can be picked out.

The 196 solutions of ARGESIM comparisons (table 1) are classified according to a set of different cri-

teria and evaluated not only with respect to features of specific simulators but also with respect to modelling approach. It has to be mentioned that classification items are dynamic in order to continue the evaluation at an up-to–date level and that if a part of a task is not solved or there was no way to figure out in which way the task was performed the classification "not mentioned" is used.

Methodology/Formal criteria

The evaluation is done in two parts. On the one hand a "methodology classification" tries to distinguish between different methodological approaches and a "general criteria" tries to catch the most important facts for a comparison.

For example in the evaluation of C3 Generalised Class-E Amplifier, the "methodology classification" checks whether a hybrid approach was taken, dividing the model in two smaller models (depending on resistor function structure), or one large model was used. The general criteria checks in which way the model was described and how the resistor function has been implemented. The time dependent resistor R(t) may be implemented in forms of a continuous function or using a table. The properties of the different implementation could vary, depending on the way table-functions are evaluated on definite points.

Methodology: Hybrid model approach / Overall continuous model

General Criteria

- Model description: block diagram / differential equations / bond graphs
- Resistor-function implementation: table/equations

Criteria for tasks

On the other hand there are criteria for each of the up to three tasks for a comparison to check the facilities of simulation software according to the special needs of the tasks. In case of C3 - Generalized Class-E Amplifier the criteria are:

Criteria Task a - Eigenvalue analysis

- Linearisation: build in function / not necessary
- Eigenvalue calculation: build in function / no function available / not mentioned

Criteria Task b - Simulation in the time domain

- Simulation method: numerical / hybrid (numerical-analytical)

- Algorithm for numerical integration: Runge-Kutta / Gear / Euler / Livermore / not mentioned

Criteria Task c - Parameter study

- Re-Initialization: manual / script
- Parameter variation: manual / loop

Webpresentation

At www.argesim.org the ARGESIM homepage presents a WWW interface to the comparison database including four sections for each of the 13 comparisons.

Section one gives a complete definition of each comparison and describes all the tasks to perform. Section two lists all the solutions for each comparison in order of date showing also the used simulation software. Section three deals with the evaluation of each comparison. It contains not only the list of criteria used for evaluation and a list with solutions sorted by these criteria but also detailed information on the criteria. Section four shows comments.

In the near future an improved WWW interface will be available offering also a powerful tool to search for keywords.

The definitions of all comparisons, and an overview on the solutions sent in may be found on our WWW-server: http://www.argesim.org/comparisons/

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SNE	C1	C2	C3	C4	C5	C6	C7	CP1	C8	C9	C10	C11	C12
						Comparisons							
0	Def												
1	5	Def											
2	4	4	Def										
3	4	3	3	Def									
4	1	5	5	2	Def								
5	4	-	1	1	2								
6	-	2	-	2	1	Def							
7	1	2	1	2	-	1	Def						
8	-	1	-	-	-	1	3						
9	-	-	-	-	-	2	3						
10	1	2	-	-	-	1	2	Def/1					
11	2	2	1	-	1	-	-	2					
12	1	-	1	-	-	-	2	3					
13	-	-	-	-	-	-	3	1					
14	3	-	-	-	-	-	2	-					
15	-	-	1	-	1	-	-	-					
16	1	-	-	-	-	-	1	-	Def/1				
17	-	-	1	-	1	-	1	1	1	Def/1			
18	-	-	-	-	-	-	2	2	-	-	Def/1		
19	-	-	-	-	-	-	-	1	1	1	3		
20	-	-	-	-	-	-	1	-	1	1	2		
21	-	1	-	1	-	1	5	-	-	-	2		
22	1	-	1	-	1	-	5	-	1	-	-	Def/1	
23	-	2	-	-	-	-	-	-	-	2	-	1	
24	1	-	-	1	-	-	2	-	-	-	1	2	
25	-	-	-	-	1	-	-	-	-	3	1	1	
26	2	1	2	1	1	-	1	-	-	1	1	1	
27	-	-	1	-	-	-	-	-	-	2	1	-	Def/2
28	-	-	2	-	1	-	-	-	-	2	-	-	2
29/30	1	1	1	1	-	3	-	-	-	-	1	-	3
Total	32	27	22	11	10	9	33	11	5	13	13	6	7

C1 Lithium-Cluster Dynamics under Electron Bombardment – MATLAB

Numerical approach

Simulator: MATLAB (short for MATrix LABoratory) is an environment for technical computing based on matrix and vector operations. One can use it either interactively (by typing the commands directly on the screen) or by programming (creating a m-file of commands). The computations of the following problem were done with MATLAB version 5.3. SIMULINK, an extension to MATLAB offers a graphical modelling environment enabling the user to operate on complex systems on a high abstraction level.

Model: The approach followed in this solution is based on a straightforward SIMULINK model. The graphical model description is given in figure 1.
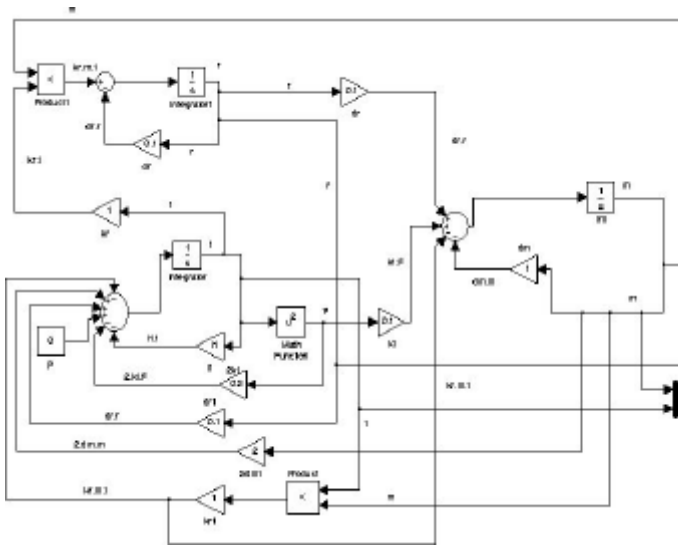
Figure 1: SIMULINK Model

Task a: Simulation of the System: After the model was built with the SIMULINK editor, a MATLAB-file was used to start the simulation. Computation times were determined with the `tic/toc` command. Figure 2 lists the different computing times.

Algorithm	Computing time
Dormand-Prince	1.27 s
mod. Rosenbrock	0,22 s
NDF	0,17 s

Figure 2: Computing times

As the system is stiff, the NDF- and the modified Rosenbrock algorithm are much more efficient, while a classical RK - algorithm (although using a sophisticated stepsize control as in Dormand-Prince algorithm) works inefficient and becomes unstable.

Task b: Parameter Variation: The parameter l_f was changed by use of the following commands (results in fig. 3):

```
for n = 1:5; lf = 10^(2+(n-1)/2);
set_param('comp1/lf', 'Gain', 'lf')
[t, x, y] = sim('comp1');
switch(n)
case 1;  m1(:,1) = x(:,1); t1 = t;
…………
case 5;  m5(:,1) = x(:,1); t5 = t;
end; end
loglog(t1,m1(:,1),t2,m2(:,1),…)
```
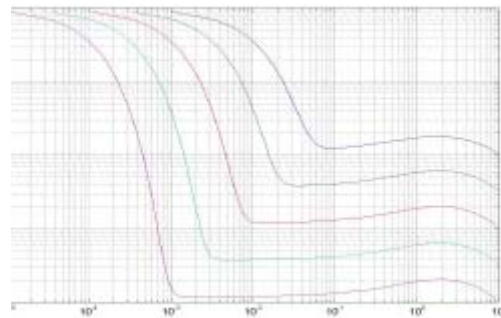

Figure 3: $f(l_f, t)$ vs. t in logarithmic scale for 5 different values of l_f

Task c: Calculation of steady states: The command `trim` computes the equilibrium points of a system, in our case $f(r,m,f)$. `trim` returns a vector $[r_s, m_s, f_s]$ with $f(r_s, m_s, f_s) = 0$ (results in fig. 4):

```
set_param('comp1/p', 'Value', '10000');
[x] = trim('comp1')
```

The results are given in the following table.

p	rs	ms	fs
0	-0.5*10-12	~0	~0
10000	1000	10	10

Figure 4: Results for steady states

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C2 Flexible Assembly Sytem – Taylor ED

Simulator. Taylor ED (Enterprise Dynamics) is a family of software products for modelling, visualisation and control business processes. It is available for Windows 95/98/2000 and Windows NT. Everything in Taylor ED is an atom (an application, a model, a product, etc). An atom is something with 4 dimensions: location, speed in space and dynamic behaviour (time).The atoms are hierarchically structured.

Atoms can be displayed in tree structures or in animation windows. The easiest way to create a model is to drag an atom from the tree view into an animation window, but 4Dscript commands can be also used. The 4Dscript Language is the interface through which all Taylor ED functionality is controlled. It is used to create manustructures, to define editing fields, to define atom functionality, to create run and analyse models, to define model logic, to control Taylor ED from outside, etc.

Model: The flexible assembly system consists of eight almost identical subsystems. *A* subsystem consists of standard atoms: *Three Non Accumulating Conveyors, one Queue (as buffer in front station) and*

one General atom (as station). For the input of palettes in the system a Source atom and for the output a Sink atom are used.
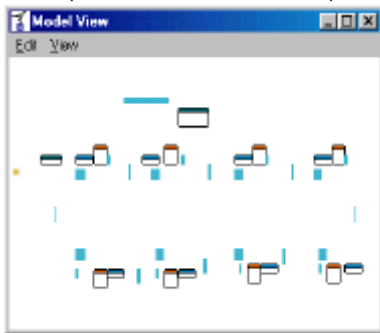
Figure 1. The model layout.

Task a: Control strategy/Statistical evaluation. The sequence of operations is ruled from Queue. It will defined if the palette should be processed in station Ax. There are six rules to define the sequence of operations. Here we need to implement the 4Dscript:

```
If(=icon(i),iconbyname([op1])),set(icon(i),iconb
yname([op2])),If(=icon(i),iconbyname([op2])),set
(icon(i),iconbyname([op3])))
```

After each operation the palettes are assigned a new icon name to indicate which operation are already finished.

Operations time, length of B1, length of buffer in front station, speed of conveyors, are adjusted in the atom editor.
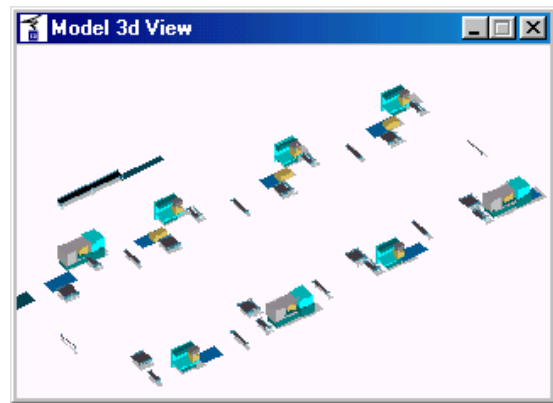

Figure 2.: 3D visualization

Task b: Simulation results - Throughput. The system is observed for a simulation time of eight hours. The results are given in table 1.

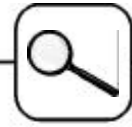| name	throughput	
	input	output
General1	226	225
General2	58	57
General2	60	59
General2	59	58
General3	110	109
General4	109	109
General5	108	107
General6	107	106

Table 1: Throughput

Task c: Simulation results - optimisiation. The throughput stayed the same for 20, 40 and 60 pallets because task A1 acts as a bottleneck.

Taylor ED does not have an implemented optimization tool but the simulation clearly showed that the version with 20 pallets is by far the best, managing the same number of processed parts as with 40 or 60 pallets but with a lower average throughput time per part.

Manual investigations show that 17 pallets also result in 1440 parts, but with lower throughput time. Average throughput time per part between the 120th and 600th minute increases when more parts are added to the system.

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C3 Generalized Class-E Amplifier – MATLAB

Overall - model approach

Simulator. Matlab is a widely used software tool based on vector and matrix manipulations for complex high speed numerical calculations and simulations. SIMULINK, an extension to MATLAB offers a graphical modelling environment enabling the user to operate on complex systems on a high abstraction level.
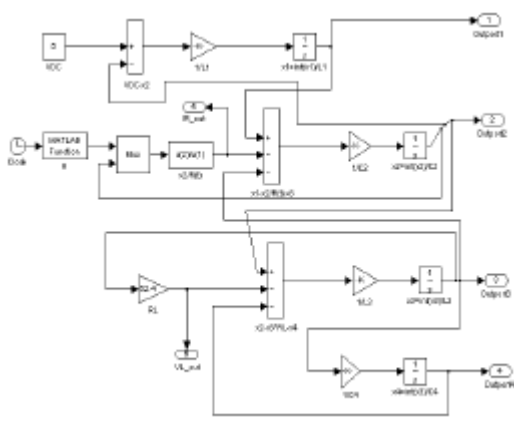

Figure 1: SIMULINK Model

Model: The approach followed in this solution is based on SIMULINK. The graphical model description is given in figure 1 where one can point out that not the whole model is implemented in SIMULINK. The resistance R(t) is realized with a MATLAB–function R(t):

```
function R_out=R(t)
global TRF;
TRF=1e-15; k=((5e+6)-(5e-2))/TRF;
 t_red=mod(t, (10e-6));
 if(0<=t_red)&(t_red<TRF)  R_out=(5e-2)+k*t_red;
elseif(TRF<=t_red)&(t_red<(5e-6))  R_out=5e+6;
elseif((5e-6)<=t_red)&(t_red<((5e-6)+TRF))
        R_out=(5e+6)-k*(t_red-(5e-6));
elseif((5e-6)+TRF<=t_red)&(t_red<(10e-6))
R_out=5e-2;
```

Task a: Calculation of Eigenvalues. This task is implemented in MATLAB as a m-function. Therefore the given ordinary differential equations is realized in the form $dx/dt=A*x$, where x is a vector of R^3 and A a time dependent matrix of R^{3x3}. The eigenvalues computed with the MATLAB eig() command are presented in the table below:

Eigenvalues OFF-Period	Eigenvalues ON-Period
-5.4708E+4 + 1.0408E+6 i	-1.1173E+9
-5.4708E+4 - 1.0408E+6 i	-6.2578E+2
-5.8228E+4 + 5.3275E+5 i	-1.1304E+5 + 6.5835E+5 i
-5.8228E+4 + 5.3275E+5 i	-1.1304E+5 - 6.5835E+5 i

Because of these eigenvalues it is clear, that the system is very stiff.

Task b: Simulation of Class E-Amplifier. To simulate this system, the MATLAB ode23-solver, a Rosenbrock – type method for stiff differential equations is used. Under the given initial state, the solution is given in figure 2 where the current $IR=x_2/R$ [in Ampere] and $VL=x_3*RL$ [in 0.1 Volt] is visualized over time. Figure 3 shows $x_2(t)$ and $x_4(t)$.
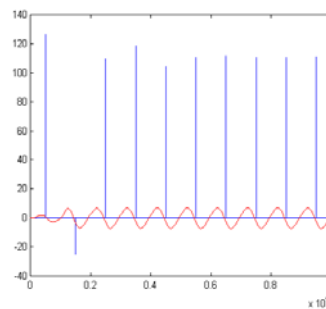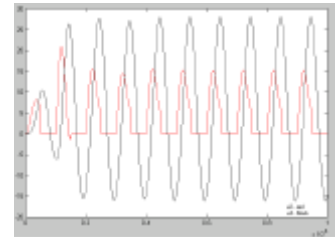

Figure 2:
*IL* and *VR* over time *t*

Figure 3:
x_2 and x_4 over time *t*

Task c: Parameter Variation Study
The parameter variied is the rise/fall time TRF. For values between 1e-15 and 1e-7 the phase portrait for x3, V2V3, IL3 is given in the figure 4.

Only for TRF=1e-7 the results differ. This TRF time means a slow switching process (time period of R(t) is 10e-6). All calculations were performed on a PII 400MHz with 256MB RAM on a LINUX platform.

Figure 4: Phase Portraits
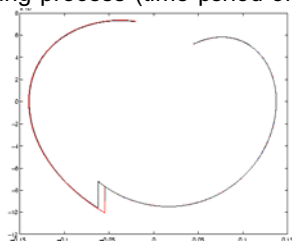
The calculation for task b) are about 35 sec, which is slow. The reason is the definition of the resistance as external MATLAB function. This way of implementation is one the one side very flexible and easy, but on the other hand the evaluation is very slow because of the interpretative manner.

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COMPARSIONS

C4 Dining Philosophers I – Arena

Simulator. Arena product family (Arena Business, Standard and Professional Editions, Arena Call Center, Arena Packaging, OptQuest) fulfills the needs for mapping processes and simulating discrete and continuous systems. With SIMAN inside, Arena exploits a heritage of power simulation software in a natural, graphical interface. The power afforded by Arena extends to its ability to integrate with other technologies, databases, drawing/modelling products or spread- sheets (ActiveX, Visual Basic for Applications - VBA, Oracle, Visio, AutoCAD, Microsoft Office, etc.).

Model. Two different ways of seizing the chopsticks are used: A1- waiting until both chopsticks are available, A2- taking first the left then the right chopstick. Deadlock may occur only in the case A2.

Figure 1 shows the model of a philosopher for the case A2. The philosopher is modelled by using Arena logic modules. At the beginning of simulation, one entity is created using the *Create* module. This entity moves throw logic modules in loop. The entity is delayed in modules *Delay* for a "Meditating" time, "Eating" time and "Cleaning" time.
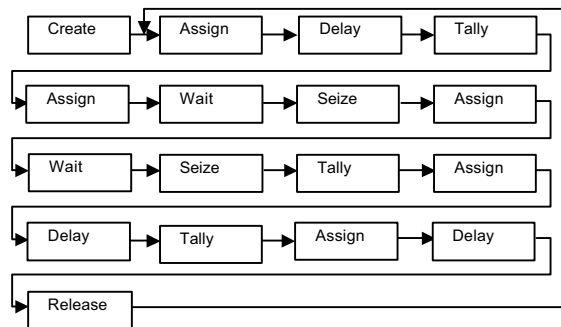

Figure 1: Model of a philosopher

Task a: Simulation/Analysis of behaviour (including deadlock). The following strategy is used to prevent the deadlock. Before a philosopher Pi obtain the left chopstick, a part of the main model checks whether other four philosophers already holds the left chopstick. If other four philosophers hold the left chopstick, he will continue waiting in Hungry state. The philosopher in the left side of Pi will obtain his right chopstick and will step in Eating state.

Figure 2: The view of the animation at the simulation time 100288

First, each of cases A1 and A2 is implemented as a separate model in Arena. For Meditating time and Eating time, it is used discrete uniform distribution U [1,10]. For Cleaning of chopsticks, it is used discrete uniform distribution U [1,2]. Table 1 shows the mean Hungry time and the Chopstick utilization. In case A1, the obtained values of the Hungry time and chopstick utilization are smaller then in A2.
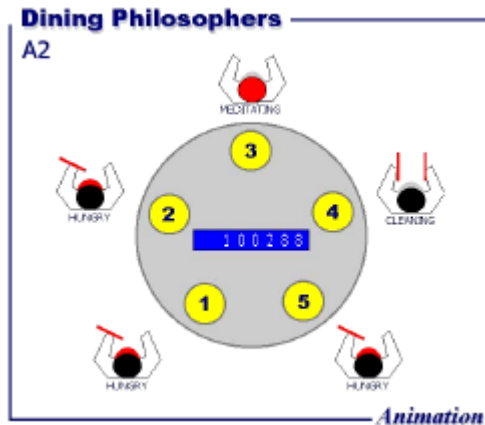
Task b: Different strategies. Later, we have assumed that only the first philosopher P1 needs more time to clean chopsticks (discrete uniform distribution U [9,10] is used). Cases A1 and A2 after this change, are denoted with B1 and B2. Table 2 shows the results. In case B1, this change had strong influence in values of Hungry time of neighbourhood philosophers P2 and P5. In case B2, the values of Hungry time for P2, P3, P4 and P5 are increased significantly in comparison with P1.

Results:

	Both chopsticks (A1)		First left then right (A2)	
	Ph.Hungry	Ch.Utilization	Ph.Hungry	Ch.Utilization
1	7.582	0.697	26.454	0.936
2	7.573	0.698	26.484	0.936
3	7.569	0.697	26.462	0.936
4	7.581	0.697	26.463	0.936
5	7.580	0.697	26.480	0.936

Table 1: Simulation time 10000000

	Both chopsticks (B1)		First left then right (B2)	
	Ph.Hungry	Ch.Utilization	Ph.Hungry	Ch.Utilization
1	7.596	0.786	27.070	0.947
2	15.229	0.619	34.982	0.948
3	6.602	0.733	34.902	0.947
4	6.600	0.619	34.850	0.947
5	15.266	0.786	35.043	0.960

Table 2: Simulation time 10000000

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C6 Emergency Department-Follow-up Treatment – Arena

Simulator. Arena is a discrete event simulation software package that employs animation. This simulator from Systems Modelling is based on the older, text-orientated simulator „Siman". In Arena it's possible to use all Siman commands and after creating your program, you are able to show your graphical model in Siman-code.It is also possible to develop sub-models to get a clear arrangement, but Arena has predefined sub-models to cover a wide range of common applications.

Model. In C6 one distinguishes between four types of patients, because each type has its own path through the system „hospital". So it's necessary to use many loops and test-commands to find out the identity of the person and you have to ask, how often the patient has passed the room, because some people need a room twice.
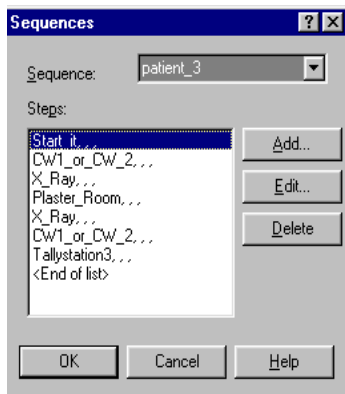
Fig. 1: Sequence-list of patient_3

To avoid this problem, four sequences-blocks were applied, where you can define the order of blocks a patient has to go to. In the following picture (Fig. 1) the sequence of patient_3, used in the simulation, is shown.

It is able to edit each station in the sequence-list, to set assignments, for example to change the picture of an entity, the attribute, a variable or to define a priority-ranking for queues (how it happened in task_c). The server named „start_it" is established to simulate the delay in registration between 7.30 and 8 o'clock. The process-time is defined as followed:

```
30 * (the_first_entity?==1) + TRIA( 0.2,0.5,1 )
```

The sub-model "CW1_or_CW2-logic"consists of a choose-block to lead the patients to the correct casualty ward, two queues (one for each ward), and four server-blocks representing four doctors (two doctors each room).

According task_b a further sub-model named changing-logic" was added (Fig. 2). This logic has the function to set the process time (VARIABLES) of doctor 2 and doctor 4 in conformity to task_b-instructions.
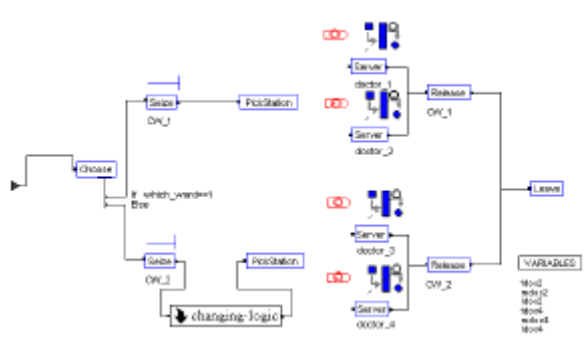

Fig. 2: Submodel changing-logic

Task a: Simulation - Average Treatment Times. In the following table (Fig. 3) you will see the results of the simulation classified by patient-types from one to four and an overall result.

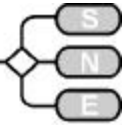| type of pat.	mean-time [min]	stdev [min]	# counted
patient_1	230	89,5	88
patient_2	141	61	50
patient_3	233	76,6	12
patient_4	133	63,6	100
all patients	174	86,9	250
time up to all patients have passed the hospital: 401min			

Task b: Doctors' Exchange Strategy. The results have changed a little (the mean time of all patients is increased to 191min, total time is went up to 427min). The doctors´ replacement occurred one time (due to the increasing queue of CW_2) and the two doctors changed to their original casualty wards before the simulation was stopped. This shows clearly that the changing-logic does not improve the treatment time, quite the reverse, the added sub-model has the opposite effect as shown below.

Task c: Priority Ranking. After testing many different priority options, the following rule performed the best result: „Patient_2 has the highest priority in all treatment queues" (without changing-logic, as task a).

type of pat.	mean-time [min]	stdev [min]	# counted
patient_1	236	78,4	88
patient_2	108	44,7	50
patient_3	257	63,7	12
patient_4	140	59,8	100
all patients	173	84,4	250
time up to all patients have passed the hospital: 388min			

Fig. 4: best results of task c (without changing-logic)

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COMPARSIONS

C6 Emergency Department-Follow-up Treatment – SLX

Simulator. SLX (Simulation Language with Extensibility) is the next generation of discrete-event simulation environment developed by Wolverine Software Corporation. Like GPSS/H, the simulation package remains textual based and compiler oriented. The developers have tailored the program to a fast and easy to use simulation system. Additional libraries may be added, mainly for computing statistical results, or to run a former GPSS/H simulation model. This comparison was done using a final release candidate.

Model. Due to the object oriented and object based properties of SLX the simulation model itself is composed by different object classes. The *patients* inside the model are realised as an object class containing boolean and integer variables to store individual attributes for controlling their movement through the emergency department. Classes for *registration, casualty wards, x-raying* and *plastering* are modelled as own object classes, which manipulate the patient's attributes using pointers. In the class *register*, the information concerning the casualty ward and the patient's type are stored for every patient. The class *patients_way* describes the way through the system for all patients depending on their type. Finally, the main program, and the running program activating all the different stations, complete the model. Realising the different rankings inside the queues, SLX offers the following syntax:

FIFO ordering (Task 1 & 2):
set(*patients***) ranked FIFO** *cw1_queue***;**
Priority ranking (Task 3):
set(*patients***) ranked(descending priority)**
*cw1a_queue***;**

For a better visibility, the bold letters show the commands, while the italic letters represent the user-defined variables.

SLX includes a library called STATS.SLX, which computes various different statistical results, including confidence intervals. Using this package, 95% confidence intervals have been built for every patient type individually, and all together, and finally written into the logging window, where all information about the model including simulation time, are displayed.

In this case, the time, each patient needs for passing all the treatment points is tabulated by:

tabulate *time_all* **= time - ACTIVE -> mark_time;**

for all patients, and similarly for every patients type. It can be seen that **ACTIVE -> mark_time** and **priority** are predefined attributes of every entity, which store creation time and priority of the entity.

After 250 patients have left the emergency department the overall treatment time of one run is calculated. The results of 20 runs are stored in a vector. After a complete task, the overall treatment time is computed and reported by using the *report_mean_ci statement* from the statistical library.

Task a: Simulation - Average Treatment Times. Using the features mentioned above, the following results in table 1 characterise the situation for task a.

The whole simulation run performing all three tasks, everyone repeated 20 times and including the computation of the results, took less than 5 seconds on a Pentium II compatible CPU with 333MHz.

Task b: Doctors' Exchange Strategy. This strategy increases the time considerably, because after about 50 minutes, 20 minutes after the doctors start work, the number of patients waiting for CW2 is more than 20 and decreases to five after more than 4 hours (see table 1).

Task c: Priority Ranking. Priority ranking turns out to be the better strategy: the overall time and the time the patients of type 1 and type 3 took decreased, patients of type 2 and type 4 had to wait longer.

	95% Conf. Int.:	Std. Dev.:
Task a)		
All:	**171.5843 ± 3.1656**	80.6453
Type 1:	235.3925 ± 4.0040	64.7290
Type 2:	135.1015 ± 4.2365	57.4348
Type 3:	243.3088 ± 7.7767	55.3139
Type 4:	125.8736 ± 2.3947	59.6734
Task b)		
All:	**185.0825 ± 3.7556**	**93.9346**
Type 1	251.5933 ± 5.7427	83.3449
Type 2	143.4306 ± 5.3984	70.4815
Type 3	263.5478 ± 10.2566	73.0636
Type 4	136.2834 ± 3.2787	69.6286
Changes: av. (20.7898 min; 252.0561 min)		
Task c)		
All:	**161.8557 ± 3.1043**	**75.8107**
Type 1	166.7460 ± 3.0338	75.4258
Type 2	165.0044 ± 5.4483	75.6281
Type 3	168.1960 ± 12.6809	69.0441
Type 4	154.6176 ± 4.7523	75.7985

Table 1 - Results of the Experiments

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C6 Emergency Department-
Follow-up Treatment – Taylor ED

Simulator. The simulator Taylor Enterprise Dynamics is an object-oriented software application used to model, simulate, visualize and control processes. It provides all the benefits and disadvantages of a windows application.

Everything in Taylor ED is an atom. These atoms are hierarchically structured, one main Atom containing all others. Each atom has four dimensions: location and time.

The user surface is graphic oriented – creating a model is easily done with dragging the model elements from the library tree into the Model Layout Window. Behind the graphic surface the 4d script is hidden; it allows the user to add or remove functionality to atoms as he wishes. Therefore a high level of flexibility is provided.

Model: An emergency department is modelled, where four kinds of causalities are admitted. Their way through Causality Ward, X-ray and Plaster Room depends on the severity of their wounds.

On creation the patient – atom is assigned an attribute, telling witch kind of patient it is. Depending on this attribute, the atom makes its way through the system. Every time a patient enters a queue the number of the channel he takes next is assigned.
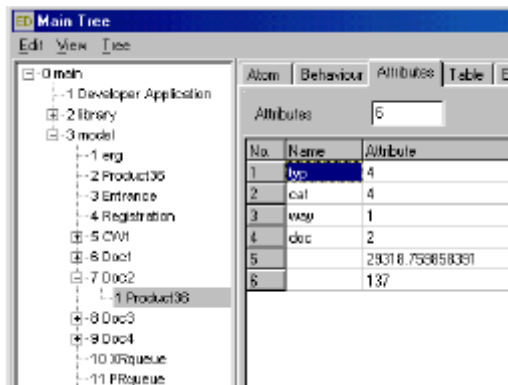
Figure 1: Attributes of Patient

The atom Availability Control offers a comfortable way of controlling the start up time for atoms. The registration atom is started at 7.30, the doctors are available at 8.00.

The results were exported to Excel for further processing
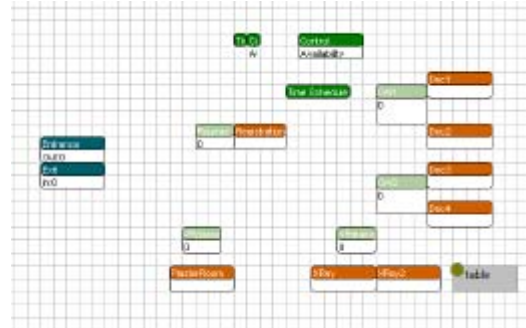
Fig. 2: Model Layout

Task a: Simulation - Average Treatment Times. Depending on the type of patient the treatment time takes between 133 and 294 minutes (see table).

Task b: Doctors' Exchange Strategy. As soon as the queue before casualty ward 2 contains more than 20 patients the more experienced doctor takes over (modelled by signals). This strategy yields an improvement for type 1 patients, but increase of treatment times for all others, also for overall tretment time (see table).

Task c: Priority Ranking. For each queue the patients carry now attributes that indicate the number of times the patient has entered this queue. Depending on this a priority ranking is established. This shows a decrease in treatment time for patients of type 1 and 3, an increase for the others. The standard derivation of time per patient decreases (see table).

type of patient	Mean time [min] task a	Mean time [min] task b	Mean time [min] task c
patient_1	240	251	180
patient_2	145	141	175
patient_3	294	233	206
patient_4	133	133	160
std. dev. of time per patient	90	95	84
overall treatment time	402	412	401

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COMPARSIONS

C10 Dining Philosophers II – Arena

Simulator. Arena product family (Arena Business, Standard and Professional Editions, Arena Call Center, Arena Packaging, OptQuest) fulfills the needs for mapping processes and simulating discrete and continuous systems. With SIMAN inside, Arena exploits a heritage of power simulation software in a natural, graphical interface. The power afforded by Arena extends to its ability to integrate with other technologies, databases, drawing / modelling products or spread-sheets (ActiveX, Visual Basic for Applications - VBA, Oracle, Visio, AutoCAD, Microsoft Office, etc.).

Model. The philosopher is modelled using Arena logic modules as it is shown in Figure 1. At the beginning of simulation one entity is created using *Create* module. This entity moves throw logic modules in loop. After that the entity is delayed in module *Delay* for a "thinking" time it waits in module *Wait* for the left chopstick to become available. When the left chopstick becomes available the entity in the module *Seize* seizes the left chopstick. After the philosopher has got the left chopstick the variable that is used to control the priority in case of a simultaneous access to one chopstick is changed. This means that the philosopher has lower priority to get the right chopstick. The entity is waiting in *Wait* module until the right chopstick becomes available. When the right chopstick is available the entity in *Seize* module seizes the right chopstick. In module *Delay* the entity is delayed for an "eating" time. In module Release the entity releases both chopsticks and moves back to the "thinking" part of the model.
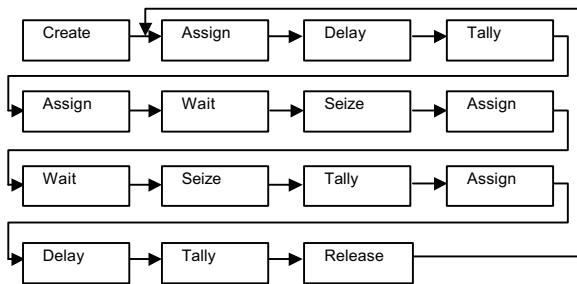
Figure 1: Model of a philosopher

Modules *Assign* are used to assign values to variables and to properties. Modules Tally are used to collect data to estimate the value of Thinking, Waiting and Eating periods.

A part of the main model is used to check whether the chopstick is available and which philosopher has priority to get it. This part of the main model will send a signal using the module *Signal* to a proper *Wait* module in the model of a proper philosopher.
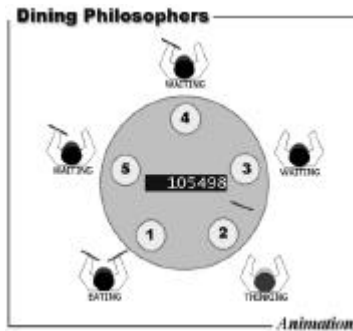
Figure 2: The view of the animation at the simulation time 105498

Task a: Simulation until deadlock / average times. The following table shows results, reported by Arena, from a simulation run with a deadlock at simulation time 3386541:

	Thinking		Waiting		Eating	
	mean	stdev	mean	stdev	mean	Stdev
P1	5.4956	2.6357	18.258	8.0738	5.4952	2.6271
P2	5.4868	2.6297	18.239	8.0529	5.5014	2.6322
P3	5.4900	2.6321	18.237	8.0619	5.5025	2.6328
P4	5.4915	2.6326	18.250	8.0789	5.4993	2.6219
P5	5.4969	2.6311	18.245	8.0558	5.5215	2.6292
All	**5.4922**	**2.6322**	**18.246**	**8.0647**	**5.5040**	**2.6286**

Utilization	C1	C2	C3	C4	C5	All
%	89.6	89.6	89.6	89.6	89.6	**89.6**

Task b: Simulation until deadlock / correct management. Our model when it was run in Batch Run (No Animation) mode deadlock occurred at simulation time 3386541 after 3.7 minutes of real time. The termination condition of our model was L1+L2+L3+L4+L5 == 5, that is all five philosophers hold the left chopstick.

Task c: Repeated simulation runs. The maximum and minimum termination simulation times, in 50 simulation runs, were 7431684 and 7044 (50 simulation runs took 65.53 minutes of real time).

Simulation was run in PC, AMD Athlon 700Mhz/ 128MB RAM, with Windows98 and Arena3.5 installed.

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C12 Sphere's Collision – MATLAB

Analytical Simulation / Event-oriented Model

Simulator. MATLAB is a widely used software tool based on numerical vector and matrix manipulation.

Model. In this solution a MATLAB function `c12` programmed which calculates the time-vector of the impacts of the spheres, a discrete time-vector, analytically. Furthermore, kind of the impact (indicating the colliding spheres), the relative positions and the velocities of the spheres at the impact times are calculated and stored.

Input parameters are the initial velocity v_1 of the 1st sphere, the restitution coefficient e, and a maximal number of impacts. Call and arguments are:

```
function
[t,Ort,v,k1,k1dot,AnzSt]=c12(x1dot,e,maxSt
)
t ... time vector of the impacts
Ort ... the relative position vector of
the spheres at the impact times
v ... the relative velocities yi, i=1..3
of the spheres at the impact times
k1, k1dot ... abs.pos. and vel. of sphere
1
AnzSt ... number of impacts in this run
```

Calling this function is equivalent to a simulation in the time domain: between the discrete time instants the movement of the spheres is linear and so the exact position of the spheres is at any time easily reconstructable.

Task a1) Simulation in time domain. Calling c12 with e=0.2 and reconstruction of the linear movement gives immediately the time courses of the differences of the sphere's movements (fig. 1)
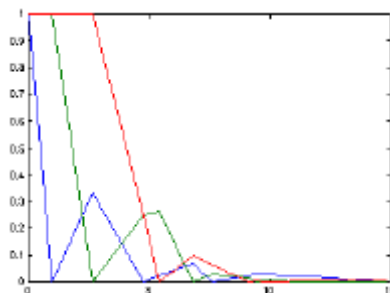
Figure 1: distance-time function y(t) simulated with e=0.2

Task a2) Final values of velocities. The final values of the absolut velocities of the four spheres for e=1 (elastic case) are: xdot=[0 0 0 1] and the final values of the absolut velocities of the four spheres for the quasi-plastic case with sufficiently equal velocities are for e=0.18, xdot=[0.25 0.25 0.25 0.25]

Task b) Variation of restitution coefficient. Calling c12 in a loop with varying restitution parameter e calculates the data for fig 2 (Number of impacts over e) and fig. 3 (final velocities over e).
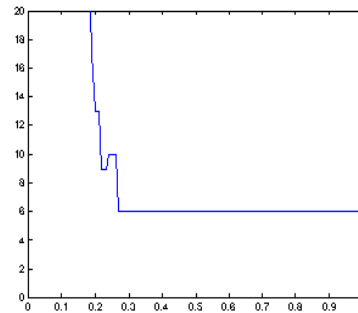
Fig. 2: Number of impacts n(e) over parameter e from 0.18 to 1
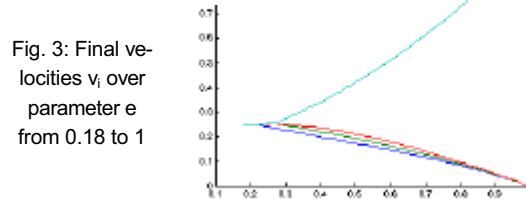
Fig. 3: Final velocities v_i over parameter e from 0.18 to 1

Task c1) Boundary value problem. The solution of the boundary value problem (Task c1)) has been realised with the Newton method. After four iterations the solution is found with an error smaller than 1e-6. The values for of e and for corresponding v4 are e = 0.5874011 v4 = 0.4999961.

Task c2) Statistical deviation of restitution. The function c12 is modified: the restitution parameter is not constant, it is normally distributed N(0.5, 0.05). A sample of 1000 simulation runs allows to calculate a statistical results for the final velocity v_4, displayed also in fig. 4. The numerical results are:

```
mean value = 0.42297, std.dev. = 0.02410
95%-confidence interval =[0.3734,0.4727]
```
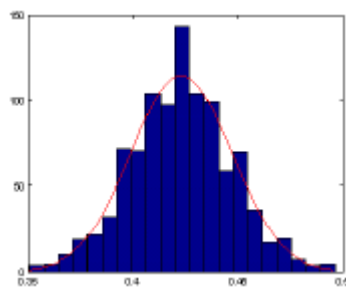

Fig. 4: Distribution function of final velocity v_4 for restitution parameter e out of N(0.5, 0.05).

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COMPARSIONS

C12 Sphere's Collision – ACSL

Algorithmic Simulation / Time-oriented Model

Simulator: ACSL is a continuous CSSL-type simulator with textual and graphical model building features and a MATLAB-like experimental environment. In this solution, only the environment ACSL-MATH is used.

Model: As the problem allows analytical solutions, AMATH - modules simulate the time courses. The state of the system is kept in variables for the relative speed and position of the spheres. The absolute position and speed of the first sphere is also kept for reasons of completeness, but is not used for further calculations.

Special AMATH modules (like m - files) are programmed in order:

- to determine the time instance of the next collision (or reveal the fact that no more collision is going to occur); (`colltime.m`)
- to update the positions for this newly gained time instance (which is simply a linear movement, no differential equations necessary) and to update the speeds according to the rules for partially elastic collisions (`model.m`):
-

These modules are called in a loop until no more collision was going to occur (i.e. all relative speeds are positive). Parts of the self-explaining code:

```
colltime;   %next collision
  while ck>0  %collision occurs
   x=x+ct*dx;  %calc.new pos.
   y=y+ct*dy;t=t+ct; %update time
 if y(j)<0  %correct wrong neg.positions
if ck==1  %perform collision
  if y(2)<=0 & dy(2)<=0
  if y(3)<=0 & dy(3)<=0
    dx=dx+(1+e)*3/4*dy(1);
    dy(1)=-e*dy(1); cm=1;
  else
    dx=dx+(1+e)*2/3*dy(1);
```

Task a) Simulation in time domain / Final values of velocities. Fig. 1 shows the distance time functions (task a1). For Task a2, results could be calculated for e=1 (elastic case), and also e=0 (plastic case). In both cases three collisions occurred, and the final velocities were $v_1=v_2=v_3=0$, $v_4=1$ and $v_1=v_2=v_3=v_4=0.25$, resp.

In order to get results for the plastic case, it was necessary to handle numerical problems with veloci-

ties near to zero and negative velocities (which occur due numerical problems because of finite word length) separately.
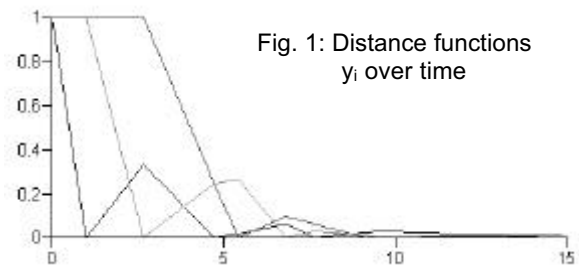
Fig. 1: Distance functions y_i over time

Task b) Variation of restitution coefficient. Because of the separately handling of small and negative velocities (numerical errors) the model calculates almost correct values down to amazingly small values of the collision coefficient (see fig. 2" for number of collisions, and fig. 3) for final velocities).
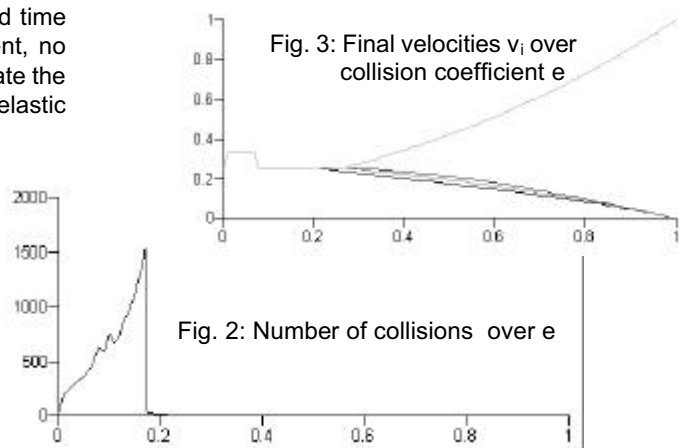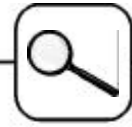

Fig. 3: Final velocities v_i over collision coefficient e

Fig. 2: Number of collisions over e

Task c) Boundary value problem / Statistical deviation of restitution coefficient. The boundary value problem (task a1) is simply solved by interpolating data calculated in task b, see fig. 3: $v_4=v_0/2$ holds, if `e = 0.5874`.

Task c2 is performed experimentally. A sample of 1000 simulation runs gives the following results:

```
mean = 0.4226, std. dev. = 0.0430
95% conf. interval:
       min = 0.3425, max = 0.5140
```

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Issue 29/30

C12 Sphere's Collision – ACSL

**Numerical-Analytical Simulation
Time-oriented Model**

Simulator: ACSL is a continuous simulator, complemented by options permitting time- and state events, too. The comparison is suited to test the handling of a large number of state events and the numerical precision. Some partial tasks demand user routines in the TERMINAL section

Model. The distance/time functions $y_k(t)$, (k = 1, 2, 3) between two collisions can be described analytically because of the constant relative velocities. After an impact at t_i the distance functions between the spheres k and (k+1) have a simple form (linear slope).

For the absolute path/time function $x_i(t)$ of the spheres simple linear relations are used.

The remaining three functions $x_2(t)$, $x_3(t)$ and $x_4(t)$ are achieved by summing up $x_1(t)$ and $y_k(t)$.

Implementation. Now, besides the velocities according to the fitting conditions, also the accompanying distance co-ordinates $y_k(t_i)$, the time t_i have to make topical in the DISCRETE sections. The number of collisions n is incremented at every call of a DISCRETE section. Parts of the model description in ACSL's model description language:

```
DERIVATIVE
x1 = x1d*(t-t0)+x10; y1 = y1d*(t-t1)+y10
SCHEDULE Collision12 .XN. y1
y2 = y2d*(t-t2)+y20;...END!of Derivative
DISCRETE Collision12
t0 = t; x10 = x1 ! path x1
t2 = t; y20 = y2
t1 = t; y10 = y1 ! distances y1, y2
x1d = x1d+(1.+e)*m2/(m1+m2)*y1d
y2d = y2d+(1.+e)*m1/(m1+m2)*y1d
y1d = -e*y1d; n = n+1
END ! of Collision12
```

Task a) Simulation in time domain / Final values of velocities. Just as the distance/time functions of task a1 (Fig. 1), the step functions of the velocities in case of spheres with little elasticity approach each other closely. Using e = 1, the final velocities of task a2 are $x_1 = x_2 = x_3 = 0$ and $x_4 = 1$. All four final velocities correspond for e = 0.18 in six decimal places with a value of 0.250000 (quasi inelastic/plastic case).
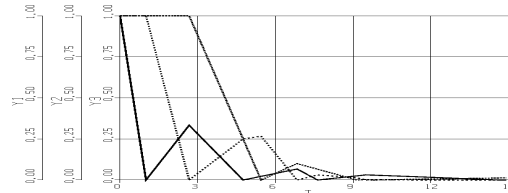
Fig. 1 Distance functions $y_1(t)$ solid, $y_2(t)$ dashed,

Task b) Variation of restitution coefficient. Fig. 2 shows the number of collisions n versus the decreasing restitution coefficient e with logarithmic scale. It achieves in case of double precision a maximum value of n = 1263 with e = 0.1715763. The final velocities of Fig. 3 point to the separate course of the last sphere.
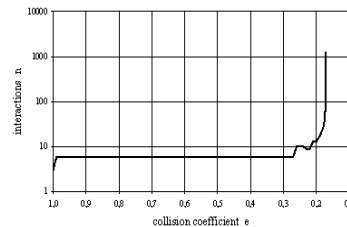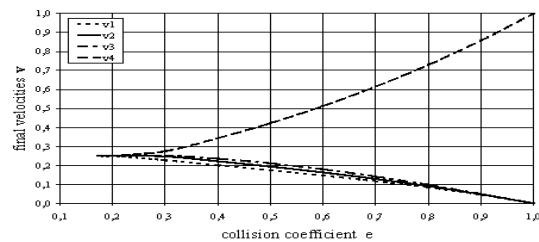

Fig. 2 Number of collisions $n(e)$

Fig. 3 Final velocities $v(e)$, v_4 upper curve

Task c) Boundary value problem / Statistical deviation of restitution parameter. A *Newton* method, implemented in the TERMINAL section, using the allocations $f(x) := v_4 - v_0 /2$ and $x := e$, iterates with e = 1.0E-09 a value of e = 0.587401052 in 6 steps.

The statistic parameters with 1000 samples from the GAUSS(0.5, 0.05) function are mean value v_4 = 0.424898, standard deviation s = 0.041321 and confidence interval CONF{$0.422337 \leq \mu \leq 0.427459$}
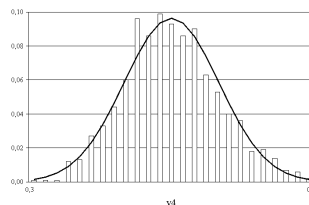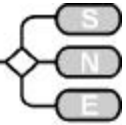

Fig. 4 Frequency comparison

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COMPARISONS

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CONFERENCE REPORTS

ASIM 2000, Hamburg

September 2000

The 14th conference on simulation techniques took place in Hamburg from 25 to 28 of September 2000. The ASIM 2000 was the first ASIM/SCS Joint Conference, announced as ASIM/ESS 2000 Joint Conference on Simulation.

The ASIM 2000 was organised on behalf of ASIM, the german speaking association for simulation with member states Austria, Germany and Switzerland, by the Institute of Computer Engineering, Faculty of Computer Science, University of Hamburg. Chairman of the ASIM 2000 Conference was Prof. Dr.-Ing. Dietmar P. F. Möller

About 180 specialists of simulation in industry and research exchanged their experiences. The first day of the conference is traditional the day of the user group meetings and tutorials. The three tutorials run very successfully: "Virtual Reality" by Dipl. Inf. Björn Kesper and Prof. Dr.-Ing. Dietmar P. F. Möller, University of Hamburg, "Java" by Dr. Roland E. Hass, EADS Airbus, Bremen, and "Passion" by Prof. Dr. Stanislaw Raczynsky, Universidad Panamericana, Mexico City. The User-Group Meetings are organised by Dipl.-Ing. Hans Gall for the User-Group Spice, Prof. Dr. Felix Breitenecker and Dr. Stahl for MATLAB/SIMULINK, and Prof. Krug and Prof. Möller for die User-Group ISSOP. A welcome party take place Monday evening in the Foyer of the Geomaticum, University of Hamburg, with a Jazz session, given by Jacid.

The opening ceremony of the conference take place Tuesday, September 26 by welcome addresses given by Prof. Dr.-Ing. Dietmar P. F. Möller (Picture 1), 2nd Major of the Free and Hanseatic City of Hamburg, Senator Krista Sager (Picture 2), Vice President Holger Weidner und ASIM President Prof. Dr. Felix Breitenecker (Picture 3).

The opening speech was given by Dr. Roland E. Haas and Dipl.-Ing. Karlheinz Thomas, EADS Airbus Industries, on "New Methods of Information technology in Avionic Design"

Five main lectures, given by Dr. Sigrid Wenzel, Fraunhofer Institute Dortmund, Prof. Dr. Rolf Schulmeister, University of Hamburg, Director Dipl.-Ing. Rolf Bielecki, GSTT Hamburg, Prof. Dr.-Ing. Dr. h.c. Paul Martin Frank, University of Duisburg, and Dr. Jo-

Jochen Wittmann, University of Rostock, showed the wide spectrum of simulation in research and industry. The lecturers dealt with problems of simulation in production and logistics, virtual learning, pipeline construction and tunneling, fault detection and cellular automata. About 95 papers, given in parallel sessions, on various topics. The industrial forum on Java, organized by SUN Microsystems Hamburg and control units in automotive systems, organized by Dipl.-Ing. Ewald Hessel, as well as the workshops on simulation in environment and geosciences, organized by Dr. Jochen Wittmann, University of Rostock, and labor- and organisation oriented profiles of simulators and simulator application, organized by Dr. Klaus Mehl, University of Chemnitz, are to be mentioned.

During ASIM 2000 several excursions are organized to EADS Airbus industries Hamburg and Bremen, showing the A3xx Megaliner and the VR Cave as well as the european Rocket Ariane, the 4th tunnel tube of the river Elbe and the Hamburg Underground Companies (HVV) training simulator.

The accepted papers of the conference had been published in the proceedings, published by the SCS publishing house Ghent and in a Supplementum, published by ARGESIM, Vienna.

Also a software and a poster exhibition completed the 14th conference on Simulation techniques.

During the visit of the 4th tunnel tube of the river Elbe the participants enjoyed a typical "mine workers break (Picture).

The ASIM farewell party start Thursday evening in the Museum of the Geomaticum of the University of Hamburg. It started with a sparkling wine, followed by warm and cold dishes, served at the buffet, and beer, wine and soft-drinks. The musical entertainment was given by the Jazz formation Jacid. As the ASIM 2000 closed Thursday, many participants leave back home but a lot of ASIM participates continuing their stay in order participating at the ESS 2000 event.

The participants of the 14th conference on simulation techniques had a very successful annual meeting in Hamburg. The organisers would like to thank to all who helped, with papers and discussions, to make the conference a success.

D. P. F. Möller, ASIM

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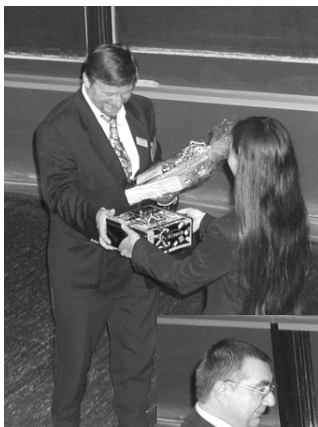
The ASIM - Board and the participants thanked during the closing session Prof. Möller and his team (pictures)

5th International Conference on Computer Simulation and Artificial Intelligence, Mexico City

16-18.2.2000, Universidad Panamerican

The 5th International Conference on Computer Simulation and Artificial Intelligence was organized by the McLeod Institute for Simulation Sciences at the Universidad Panamerica in Mexico City, from February 16th to 18th by Prof. Dr. Stanislaw Raczynski (Director del Programa) and Dr. Mario Acevedo (Director del Evento), with more than 35 papers, and over 100 participants from Mexico, USA, Canada, France, Germany, Italy, Poland, Russia, Spain, UK. The UP2K event was somewhat different from a „normal" conference of the Society for Computer Simulation, as mentioned by Prof. Stan Raczynski. Because the UP2K was an international conference, but has many characteristics of a local event. It has less papers and most of the participants are not authors. On teh other hand the registration fee is low and the participants are mainly students or persons who hardly can attend a conference with more the 400 US$ of registration fee.

The main topics of the conference enclude Methodology, Applications in Engineering, Service Systems and Interdisciplinary Applications and Transport Systems, and Artificial Intelligence.

After the opening ceremonia, Prof. Dr. Möller, University of Hamburg, Germany, gave his invited key not lecture on „Virtual Reality: A Methodology for Advanced Simulation in Science, Technologyy and Education".

The 35 accepted papers of the authors, presented in 7 sessions, showed the wide spectrum of simulation techniques. The accepted papers of the conference had been published in the conference proceddings which can be ordered from Prof. Stan Raczynski. The sessions were embedded within specific main topic papers, given by well known outstandig experts:

- Andrej Bargiela, University of Nottiingham, UK, „Operational Decision Support Through Confidence Limits Analysis and Pattern Classification"
- Marco Ceccarelli, Universita di Cassino, Italy, „Numerical Simulation and Experimen-tal Determination of Manipulator Workspace"
- Roman Borgacz, Warsaw University of Technology, „Simulation Problems of High-Speed Trains"
- Francois Cellier, University of Arizona at Tucson, USA, „Inlining StepSize Controlled Fully Implicit Runge-Kutta Algorithms for the Semi-Analytical

and Semi-Numerical Solution of Stiff Odes and DAES"

- Shimon Nof, Purdue University at W. Lafayette, Indiana, USA, „Tools and Models for E-Work"

The participants of the 5th conference had significant and eventfull days in Mexico City. The MISS International Director and Coordinator, Prof. Dr. Möller, would like to say „Thank you" to all who helped in organization, with papers and discussions, with financial support, to make the conference a success. Hopefully we will see most of them again at the 6th International Conference on Computer Simulation and Artificial Intellingence in one of the most fascinating cities of the world, in Mexico City.

D. P. F. Möller

The Twain Meet, Warwick
Discrete Event Simulation and System Dynamics

The Simulation Study Group is one of the OR Society's success stories of recent years. Since its revival three years ago, its meetings have been very well attended and very interesting. The latest meeting, at the University of Warwick on April 12th (Discrete Event Simulation and System Dynamics: Never the Twain Shall Meet?), was no exception. There were over sixty attendees at this one-day event, which was a joint meeting with the UK Simulation Society.

However the word "twain" in the title does not refer to these two groups - in fact many attendees were members of both! - nor to a meeting between academia and industry, although both were well represented in the audience. The theme of the day was a debate on the choice of simulation methodology between discrete event simulation and system dynamics, and the proposition was that "never the twain shall meet".

Traditionally discrete event simulation (DES) is used for systems which are modelled as queueing networks, and where state changes in the system occur at discrete points of time. For example a DES model of a manufacturing process would model each individual work item separately. The time each item spends at each stage of production is sampled from a probability distribution.

On the other hand system dynamics (SD) models a system as a series of stocks and flows, in which the state changes are continuous. An SD model of the above industrial process would view "work items" as a continuous quantity, rather like a fluid flowing through

a series of pipes and tanks. The time spent in each stage is modelled by fixing the rate of flow from one stage to the next. Thus SD is essentially deterministic whereas DES is stochastic. The aim of this meeting was to discuss whether the choice of methodology was purely the personal preference of the modeller, or whether there were identifiable features of systems which would make one methodology superior to the other.
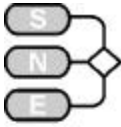
The meeting was held in Warwick's new Executive MBA Teaching Centre, an impressive venue despite the wet and windy weather, and was chaired by Susan Howick from Strathclyde University. he first speaker was David Lane from the London School of Economics. He set the scene for the day with his session "You Just Don't Understand Me:

Modes of Failure and Success in the Discourse Between System Dynamics and Discrete Event Simulation". In his stimulating and entertaining talk David suggested that there are three modes of discourse. Mode 1 ("Chalk and cheese") says that the two approaches are inherently totally different and should retain their distinctiveness. Mode 2 ("All the same really") says that DES and SD are basically the same thing, with superficial differences.

Curiously, both of these position could supported by looking at the aspirations, validation assumptions etc. of the two approaches. However, David suggested that these were both failure modes if the aim was the improvement of the two disciplines. As an alternative he proposed a Mode 3, which he felt was the way forward, which involved a deeper understanding and appreciation of both the similarities and the differences.

To illustrate this view he offered a theoretical analysis of the distinctive ways in which DES and SD treat different types of complexity, and also used a pair of healthcare applications to give a practical perspective. He closed by suggesting that a 'Mode 3' style informed and critical debate between DES and SD would lead to better models and advances in simulation as a whole.

The second speaker was Steve Curram from HVR Consulting Services, who presented a system dynamics model he developed for the Canadian Department of National Defence to investigate the potential impact of the Millennium Bug on their effectiveness. The model represented the international defence arena and involved modelling different mission phases and the defence forces, plus support, supplies and strategic transport. The details of the problem situation
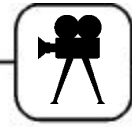
meant that the choice of modelling approach was not clear-cut.

Some aspects indicated SD (the scope of the model, the long timescales, the large number of entities in some classes, and the effects of feedbacks and delays), whereas others indicated DES (the small number of entities in some classes, the effects of variability, and the tracking of individual order requests). The final model used the SD software Powersim but incorporated features of DES. In a fascinating talk Steve discussed the pros and cons of each approach for the study and described the structures that were used to implement discrete behaviour.

After lunch Janet Lee and Andrew Tobias from the University of Birmingham presented the results of some ongoing work with Pelham Barton, on applying DES and SD to essentially the same problems, to compare the results. They used a classical problem from the SD literature, Wolstenholme's staff recruitment and leaving model, where staff join a company, train, work and then leave at given rates, and a classical problem from DES, the assembly problem, where a number of components are manufactured and then assembled into a finished product. It proved surprisingly difficult to replicate the results from the DES models simply by adjusting the rate of flow criteria in the SD models.

The meeting ended with a lively open forum discussion about the issues raised at the meeting. David Lane proposed the launch of an initiative aimed to carry the work of the meeting forward. He felt that a dedicated SD Study Group would be too inward-looking, and he wished to further his "Mode 3" by encouraging collaboration and integration between SD and other methodologies. Anyone interested in joining such a group should contact

David at d.c.lane@lse.ac.uk, Tel 020 7955 7336.

The next meeting of the Simulation Study Group is on July 12 at Lancaster, on the theme of simulation software, model re-use and integration, and groupware.

Dr Sally Brailsford
Department of Management,
University of Southampton, Southampton, UK

SIMS 2000, Lynbgy

The 41st SIMS (Scandinavian Simulation Society) conference was held September 18-19 in Denmark at The Technical University of Denmark. The scope of the conference was broadened being an integrated part of a Ph. D. course on the subject of "Simulation of Energy Systems", which was supported by The Nordic Energy Research Program. Furthermore a workshop on the use of Engineering Equation Solver was given in parallel to the conference. Approximately 65 people attended the conference mainly coming from the Scandinavian countries but attendees from USA, France, Lithuania and Spain was also present.

Two major themes was dominant among the 25 presentations:

- Modelling and Simulation Software used in Engineering Education
- Examples of the use of Modelica

The invited speaker, Professor Sanford Klein from The University of Wisconsin, USA, treated the first subject. He has a unique combined background in teaching applied thermodynamics and in developing modelling and simulation software (TRNSYS, EES, CP/Thermo, FEHT).

Examples of the use of Modelica were primarily given by researchers from Lund and Linköping University, Sweden but also a few researchers from The Technical University of Denmark are now working intensively with Modelica.

It is obvious that the earlier focus on numerical methods and computation speed is changing to modelling methods and examples of what knowledge can be obtained from the use of simulation models. The on-line use of models is also becoming more feasible.
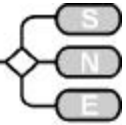
Based on the feedback from the attendees and the experience by the organisers it is believed that Modelling and Simulation conferences like the SIMS conference will continue to be a stimulating element in the future.

More information on the conference can be obtained from the homepage: www.et.dtu.dk/sims

The conference proceeding (approximately 360 pages) can be ordered by mailing: sims@et.dtu.dk

Arne Jakobsen

CONFERENCE REPORTS

Agent-Based Simulation - Workshop 2000, Passau
Passau, May 2-3, 2000

Agent-based systems are of increasing importance. They are regarded as a new paradigm enabling an important step forward in empirical sciences, technology and theory.

This new paradigm has an enormous influence on model building and simulation. Novel design patterns and architectural structures open up new possibilities. Furthermore, new areas of application come into the foreground.

Workshop 2000 - Agent-Based Simulation was intended to offer a forum for all interested in agent-based simulation to discuss methodologies, techniques and applications.

The workshop was concerned with the simulation and not with the design or construction of agents.

Properties of Agents
- Autonomous Behaviour
- Individual World View
- Communicative and Co-operative Capacity
- Intelligent Behaviour

Interesting problems in agent-based simulation
- Strategies and Decentral Control
- Emergent Behaviour
- Co-operative Problem Solving

The workshop was preceded by an scientific and personal event on the occasion of Bernd Schmidt's 60th birthday (see report in this SNE issue).

The workshop was opened by B. Schmidt, Francois Cellier chaired the first plenary session (picture):
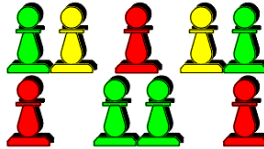
Plenary papers with overview about models and methods e.g.

- How to Give an Agent an Attitude, Penny Ray, Dickson Lukose, Mark Toleman, University of Southern Queensland, Australia
- Social Norms, Inequality, and Functional Change in Artificial Societies -Some More Results, Nicole J. Saam, Universität München, Germany
- A Negotiation Model for the Simulation of Intentional-Agent Systems, Fernando Lopes, Nuno Mamede, Helder Coelho, A. Q. Novais, INETI, Lisboa, Portugal
- Agent-Based Simulation of Human-Influenced Ecosystem: the Hydraulic Management of the Camargue, Nathalie Franchesquin, Bernard Espinasse, Université d'Aix - Marseille, Marseille, France
- Simulation of Car-Sharing-Customers and Request-Broker-Agents, Thomas Wiedemann, Technical University Berlin, D
- Rational Choice - A Framework for Multi-Agent Systems?, Lepperhoff Niels, Forschungszentrum Jülich, D
- Simulation of Multiagent Behaviour-Based Robotic Systems, Jerzy A. Barchanski, Luis Veci, Brock University, St. Catharines, Canada
- WebSeeker: a Means of Efficiently Locating Resources on the World Wide Web Using Mobile, Collaborative Agents, D. J. Grey, P. Dunne, Robert Ian Ferguson, University of Sunderland, Sunderland, UK
- A Competition-Model for the Electricity Sector: from an OR-Approach to a Multi-Agent System, Ch. Weinhardt, Pascal Zuber, W. Fichtner, M. Wietschel, M. Göbelt, O. Rentz, University of Giessen, Giessen, Germany

Furthermore, 26 papers from application areas showed the broad variety of the theme.

Worshop 2001

Because of the success of Workshop 2000 and because of the importance of the topic there will be a successor Workshop 2001 on April 2-4, 2001 in Passau. Detailed information about this event:

www.or.uni-passau.de/workshop2001

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Issue 29/30
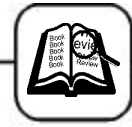
BOOK REVIEWS

SNE Book Reviews - New Style

In order to give the reader a better overview about a book, a new style for a SNE Book Review has been designed. Central point of this new style is a rating for the book, shown in the following table:

Beginner	Intermediate	Expert
	●	
Theory	Mixed	Practice
	●	
Lecture Note	Monograph	Proceedings
	●	

The rating follows three different classifications, which should support the personal reviews:

- Readership: Does the book address novices in the area discussed, or is it for experts ? - from Beginner via Intermediate to Expert
- Contents / Theory- or Application- Oriented: Deals the book purely with theory in a specific area, or introduces it into applications too ? - from Theory via Mixed to Practice
- Contents / Style: Can the book be used for teaching, or is it a classical monograph, or does it summarise the contributions of a conference ? - from Lecture Note / Encyclopaedia via Monograph to Proceedings

There may be more than one mark in a classification, crossing also the border between the classes, in order to give a more flexible rating:

Beginner	Intermediate	Expert
	● ●	
Theory	Mixed	Practice
		● ● ●
Lecture Note	Monograph	Proceedings
●	●	

Furthermore, shortcuts indicate, whether the book comes with a CD ROM (with examples or demo software, or as book complimentary), or whether the book refers to a website (with additional info, reviews, software, hotlinks, etc):

🌐   The book refers to a website

🖫   The book comes with a CD ROM or a disk

We hope, that this new style allows a better and concentrated information for the reader.

Bondgraphs (in German)

Eine Methodologie zur Modellierung multidisziplinärer dynamischer Systeme
Wolfgang Borutzki
ASIM / SCS Fortschrite in der Simulationstechnik
ISBN 1-56555-183-4 xvi, 414 Seiten

This book gives an introduction in the bondgraph modelling methodology. It summarizes the theory from the basics to multibond modelling. Also numerical aspects of the solution of a bondgraph referring to the added causalities are presented. Symbolic approaches on the solution of the resulting differential algebraic equations are described.

The overview on this theory is complete, which makes the book become an important summary on bondgraph methodology written in German language.

Beginner	Intermediate	Expert
	●	
Theory	Mixed	Practice
	●	
Lecture Note	Monograph	Proceedings
	● ●	

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Numerical Insights into Dynamic Systems

Interactive Dynamic System
Simulation with Microsoft Windows 95™ and NT™
Granino A. Korn
Gordon and Breach Science Publishers
ISBN 90-5699-156-6 xvi + 213 pages, 2 🖫

This book is concerned with simulation of dynamic systems, giving a course on interactive simulation. To use the already acquired knowledge when studying the book a reduced version of the simulation software DESIRE is added on two diskettes. With this system all examples given can be simulated. DESIRE is also the software the text refers to when giving useful information on building models and experiment interactively.

The book is organized in 7 chapters and 4 appendices. The first gives a survey in simulation techniques, especially describes the needs for interactive simulation. Chapter two presents some classic models programmed in DESIRE in order to make the reader familiar with the basic features of this system. This knowledge is basic for the advanced programming

BOOK REVIEWS
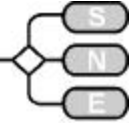
techniques (user defined functions, vector and matrix numerics) shown in chapter two. Chapter four only deals with vector and matrix models. Following the concept of hierarchical modelling chapter five describes the use of sub models. Chapter six and seven help the reader to learn about specialities and tricky programming techniques of DESIRE.

Some pretty good information, due to the title „numerical insights" are given in an appendix dealing with rising simulation accuracy and the stability and limits of the implemented integration algorithms. The appendix-chapter also contains references on DESIRE and interactive handling of this system.

Altogether the book is a „All-in-1" tutorial on dynamic system simulation. It is worth to be mentioned, that the reader (ie. student, engineer) can use the included system DESIRE to study the use and properties of interactive simulation.

Beginner	Intermediate	Expert
	●	
Theory	**Mixed**	**Practice**
●	●	
Lecture Note	**Monograph**	**Proceedings**
	●	

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Partial Stability and Control
V.I. Vorotnikov, Birkhäuser, Boston, 1998
ISBN 0-8176-3917-9, 448 pages,
Hardcover, DM 188.- / öS 1373.- / sFr. 158.-

Partial Stability and Control develops a new, efficient method of analysis and of control synthesis for problems on partial stability and control in dynamic systems described by ordinary differential equations, including delay, stochastic and uncertain systems. The method is based on efficient procedures of transformation on initial systems or their subsystems, for controlled systems, and allows the solutions to be simplified. In addition, the method also allows many linear and nonlinear problems to be solved that cannot be easily done with available methods. Ample attention is given to nonlinear game-theoretical problems of reorientation of an asymmetric solid.

The book is organized in an introduction and 7 chapters. The introduction describes the general situations and specific problems of stability and stabi-

lization with respect to part of the variables. Also some methods to solve these problems are described.

In the first chapter are described the linear problems of stability, stabilization, and control and in the chapters two to four the nonlinear.

Chapter five deals with nonlinear game-theoretical problems and chapter six describes the stability and stabilization of functional-differential equations. Chapter seven last but not least deals with stability and stabilization of stochastic systems.

All chapters describe the problems with methods for stability, stabilization and control with respect to part of the variables.

Although the book gives a very comprehensive introduction to stabiliy and stabilization it is recommended that the reader has some basic knowledge. Because of this and the theoretical way of the descriptions it will be a usefull reference for advanced graduates and professionals in applied mathematics, mechanics and control, and control engineering who use stability theory and control methods.

Beginner	Intermediate	Expert
		● ●
Theory	**Mixed**	**Practice**
● ●		
Lecture Note	**Monograph**	**Proceedings**
	●	

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Compartmental Modeling with Networks
Gilbert G. Walter, Martha Contreras
Birkhäuser, Boston, 1999
ISBN 0-8176-4019-3, 272 pages,
Hardcover, DM 128.- / öS 935.- / sFr. 108.-

The book Compartmental Modeling with Networks provides a thorough and comprehensive guide for compartmental models, model construction, and interdisciplinary applications.

Compartmental models, or flow models, are used when there is a flow of information of materials, such as fluids, money, energy, and resources, between the components of a given system or network. They are widely used in biomedicine and ecology, yet have great utility in other disciplines, e.g. input-output analysis, competition models, epidemiology, networks, and genetics.

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The book is divided into four parts. Part One is devoted to the stucture of the models as represented by directed graphs; Part Two addresses Markov Chains; Part Three is devoted to diverse applications; while Part Four covers the theoretical aspects of compartmental models. All topics, models, and methods are presented in a clear style with many helpful examples and background information.

The topics of the book are:

- Self-contained introduction to graph theory
- Coverage of both discrete and continuous models applications
- Selected examples using a computational program, MAPLE, in graph theory and matrix algebra problems
- Use of a wide variety of interdisciplinary applications and realistic models

This book is an essential text/reference for all advanced students, practitioners, and professionals in applied mathematics and sciences who are in need of greater understanding and skills in using compartmental models in their work and research.

Beginner	Intermediate	Expert
	● ●	
Theory	**Mixed**	**Practice**
	●	
Lecture Note	**Monograph**	**Proceedings**
	●	

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Application and Computation of Orthogonal Polynomials

W.Gautschi, G.H. Golub, G.Opfer (Eds.)
Birkhäuser, ISBN 3-7643-6137-9

The first conference on Applications and Computation of Orthogonal Polynomials which took place March 22-28, 1998, at the Oberwolfach Mathematical Research Institute gave a collection of papers summarized in this volume. The application of Orthogonal Polynomials adress problems in applied mathematics as well as problems in engineering and the sciences. Prominent among the former are least-squares approximations, Gauss and related quadrature, iterative methods in linear algebra, the detection of singularities and integral equations. Application of the latter kind include the use of wavelets in medical diagnositcs and the relevance of orthogonal polynomials in

optimal control, dynamical systems, and gas dynamics.

Computational methods relate to numerical and symbolic computations and include, in paritcular, matrix interpretation and convergence, perturbation, and stability analysis of relevant algorithms. Generalizations of orthogonal polynomials are also considered, for example, s-orthogonal, matrix- and tensor-valued, Müntz-type, and complex orthogonal polynomials. Some papers discuss applications to differential equations and the physical sciences. One of them use nonstandard orthogonal polynomials in spectral collocation methods for solving boundary and eigenvalue problems. Another tackles Schrödinger's equation and requires Jacobi matrices associated with singular measures. Multidimensional Hermite polynomials make their appearance in the resolution of certain balance equations in the kinetic theory of gases and liquids. Every paper introduces with an abstract, the LATEX-style formation of text makes this book a good survey on the state of the art in this research field and makes it of interest to a wide audience of numerical analysts, engineers, and scientists.

Beginner	Intermediate	Expert
	● ●	
Theory	**Mixed**	**Practice**
	● ●	
Lecture Note	**Monograph**	**Proceedings**
		●

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A Probability Path
Sidney I. Resnick, Birkhäuser 1999
ISBN 0-8176-4055-X

This textbook is geared toward beginning graduate students from a variety of disciplines whose primary focus is not necessarily mathematics for its own sake. Instead this book is designed for those requiring a deep understanding in advanced probability for their research in statistics, applied probability, biology, operations research, mathematical finance, and engineering. A one-semester course is laid out in an efficient and readable manner covering the core material.

The first three chapters provide a functioning knowledge of measure theory. Chapter 1 deals with sets and events, chapter 2 with probability spaces and chapter 3 with random variables, elements and measurable maps. So these chapters cover enough meas-

ure theory to give a student access to advanced material. Chapter 4 discusses independence. Expectation and integration is covered in chapter 5, which also gives attention to comparing the Lebesgue vs. the Riemann integral, followed by topics on different models of convergence, laws of large numbers with applications to statistics (quantile and distribution function estimation), and applied probability. Two subsequent chapters offer a careful treatment of convergence in distribution and the central limit theorem. The final chapter treats conditional expectation and martingales, closing with a discussion of two fundamental theorems of mathematical finance.
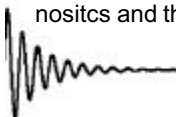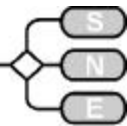
"A Probability Path" is rich in appropriate examples, illustrations, a problems, and is suitable for classroom use or self-study.

Beginner	Intermediate	Expert
	●	
Theory	Mixed	Practice
	●	
Lecture Note	Monograph	Proceedings
●	●	

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Handbook in Measurement (in German)
Handbuch der Messtechnik
Jörg Hoffmann (Hrsg.)
Hanser 1999, ISBN 3-446-21123-3

This book presents an extensive Compendium for engineers, scientists and technicians, who are faced with problems concerning measurement.

With the help of about 70 authors from universities and companies this handbook is up to date in almost each topic in the wide field of measurement. A bibliography and a list of companies and institutions helps the reader to easily find further information if needed.

Beginner	Intermediate	Expert
	●	
Theory	Mixed	Practice
	●	● ●
Lecture Note	Monograph	Proceedings
● ● ●		

Nikolaus Viertl
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Production Control by means of modular Simulation (in German)
Produktionssteuerung mittels modularer Simulation
Gert Blazejewski Verlag der Gesellschaft für Unternehmensrechnung und Controlling m.b.H., 2000, ISBN 3-934235-04-2, 265 pages

- This book is written for practitioners working in the region of product management and product controlling. It's also for students and researcher with an interest in new developments in the region of simulation tools and PPS-systems. Some topics of this book are:
- Basics of PPS-systems and simulation tools
- Summary of scientific knowledge of methods of production controlling
- A library of reference models
- An example: simulation model of a pipeline adjustment.

Beginner	Intermediate	Expert
●		
Theory	Mixed	Practice
		●
Lecture Note	Monograph	Proceedings
	●	

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Simulating Organisations
Computational Models of Institutions and Groups.
Edited by Michael J. Prietula, Kathleen M. Carley and Les Gasser (Eds.)
AAAI Press / The MIT Press 1998
ISBN 0-262-66108-x; 248 Pages

Spaceships and high speed trains, molecular dynamics and assembly systems have been simulated for years. Simulation of organisations however has been left out up to recently. The globalisation of the economy, an increasing number of transnational organisations and rapid changes in robotics, information and telecommunication technologies are some of the factors significantly altering organisational time scales, forms, complexity and environments. Computational modeling affords opportunities to both understand and respond to these complex changes.

This book gives a summary of recent developments on the topic Simulating Organisations. There are three sections: Organisations as Multi-Agent Sys-

tems, Organisations and External Conditions, Organisations and Information Technology. The individual articles present both new theory for modelling and reports of successful case studies.
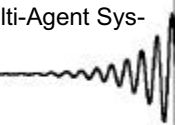
The content covers diverse fields like system analysis, sociology of organisations, information technology, software design and brings them all together in the interdisciplinary Simulation of Organisations.

Beginner	Intermediate	Expert
		●
Theory	Mixed	Practice
	●	
Lecture Note	Monograph	Proceedings
	● ●	●

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Synergies and Conflicts between object-oriented and cybernetic modeling (in German)

Synergien und Konflikte zwischen objektorientierter und kybernetischer Modellierung.
Oliver Becker, Peter Lang GmbH, 1999
ISBN 3-631-34980-7, 348 pages, öS 792.-

The author tries to combine object orientation and cybernetics usefully. He developed an evaluation rating of methods of modelling. This method is very flexible and can be used for other cases of application.

He specifies the method of cybernetics and the method of object orientation with all it's problems. He also links these methods and describes an programming language, models and theories about this topic. Now he applies this two methods to the model of stock. The exclusion builds the rating of this modelling methods.

Beginner	Intermediate	Expert
●		
Theory	Mixed	Practice
		●
Lecture Note	Monograph	Proceedings
	●	

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Stabilization of Linear Systems
Vasile Dragan, Aristide Halanay
Birkhäuser Boston, 1999
ISBN 0-8176-3970-5, 308 Pages.

The present monograph gives a profound overview of today's theory of stabilising linear systems in state space representation. Although mathematical prerequisites are just advanced calculus and linear algebra. the text presents many results obtained by the authors.

The book focuses on stabilisation of systems with slow and fast motions, on stabilisation procedures that use only poor information about the system (high-gain and adaptive stabilisation), and also on discrete time implementation of the stabilising procedures.

This is not a book on control, as the authors say, but on some mathematics of control. Besides mathematicians research engineers with a thirst for mathematical background will benefit from this book.

Beginner	Intermediate	Expert
		●
Theory	Mixed	Practice
●		
Lecture Note	Monograph	Proceedings
	●	

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Parallel and Distributed Simulation Systems
Richard M. Fujimoto, John Wiley & Sons, 2000
ISBN 0-471-18383-0; 300 Pages.
http//www.cc.gatech.edu/computing/pads

The vast expansion of the internet and development of parallel computers has brought (back) high interest in parallel and distributed simulation (PADS). Applications can be found in analysis of complex systems as well as in computer generated virtual worlds for professional training, interactive computer games and the entertainment industry.

Fujimoto, PADS expert and Professor at Georgia Institute of Technology, puts a profound introduction on discrete event simulation to the beginning of his book and extends the well known concepts of time/event driven execution, deadlock avoidance, lookahead and concurrency to parallel and distributed simulation. Underlying hardware technologies as well as application examples round up the introduction.

BOOK REVIEWS
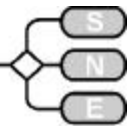
The remainder of the book is divided into to sections: Parallel and distributed discrete-event simulation primarily aims at analysis applications such as to design large, complex systems. Here the goal is to use multiple processors to speed up execution. Various concepts of (conservative and optimistic) synchronisation algorithms are presented and explained with examples. In contrast to these space parallel systems a chapter on time parallel simulation closes section one. The second section is concerned with distributed virtual environments. Here the emphasis is on real-time simulations to create virtual environments into which humans may be embedded. The first part focuses on Distributed Interactive Simulation and the High level Architecture (both arising from the military community). Finally, computer networks and their effective utilisation for large scale simulations (many interacting components) and the problem of synchronisation and synchronised clocks are discussed.

This book is indeed a state-of-the-art guide for the implementation of distributed simulation technology!

Beginner	Intermediate	Expert
	●	
Theory	Mixed	Practice
	●	
Lecture Note	Monograph	Proceedings
●	● ●	

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The Expanding Worlds of General Relativity.
Einstein Studies, Vol. 7
Goenner, H., et al. (editors)
Birkhäuser, Boston, 1999
ISBN 0-8176-4060-6, 512 +xiii pages

Based on the Fourth International Conference on the History of General Relativity hosted by the Max Planck Institute for the History of Science back in 1995, the four parts of the book contain various contributions concerned with historical developments finally yielding the field equations as well as subsequent discussions of the new theory and also give an overview of the state-of-the-art research work done in recent decades.

The papers collected in the first section focus on the genesis of general relativity and are highly recommendable for anyone interested in an historical overview of the tough and erroneous way which however finally yielded the general field equations in 1915.

The reader will be shackled by the fascinating synergy of mathematics and physics binding together the calculus of differential invariants and tensor analysis with cosmologic observations, e.g. the mysterious anomaly in the perihelion motion of mercury. Furthermore he will be introduced to numerous "friends along the way" researching and corresponding with Albert Einstein.

The second part titled "Relativity at Work" principally covers the decades following the year when General Relativity was postulated and deals with subsequent discussions as well as various proposed extensions such as the Penrose-Hawking Singularity Theorems of more recent years. Especially, one can find an interesting historic contribution revealing the Austrian scientists, the "Viennese relativity community", to play a fundamental role in the further growth of the new theory.

The following section presents a detailed discussion of cosmological models covering the years when one tried to escape from the paradox between infinite total mass and vanishing average matter density in early Newtonian cosmology up to the abandonment of Steady-State Theory in favour of the nowadays well established relativistic model of our universe.

In the last section ("relativity in debate") recent questions concerning the nature of space-time theories are the subjects of the controversies under consideration. The wide variety of methodological approaches attests the spirit of co-operation and understanding in this interdisciplinary group of working scientists, historians and philosophers of relativity.

Finally it should be emphasized that this volume is far away to be read-only for hardcore mathematicians but as well addresses to anyone interested in history and the philosophical aspects of Theory of General Relativity in the sense above.

Beginner	Intermediate	Expert
●	●	
Theory	Mixed	Practice
	●	
Lecture Note	Monograph	Proceedings
		●

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◉ Corresponding Website exists
◣ Disk included

BOOKS AND JOURNALS

JASS - The Journal of Artificial Societies and Social Simulation

an interdisplinary journal for the exploration and understanding of social processes by means of computer simulation. ISSN 1460-7425

JASSS

http://jasss.soc.surrey.ac.uk/JASSS.html

- Editor Nigel Gilbert, University of Surrey, UK ;
- Forum Editor: Klaus G. Troitzsch, Koblenz-Landau University, Germany;
- Review Editor: Edmund Chattoe, University of Surrey, UK

Editorial

World-wide interest in the potential of computer simulation for addressing issues in the social sciences has been growing since at least the beginning of the 1990s. The founding of this journal is just the latest step in a sequence which seems to be following the sociologists' of science template for the growth of new scientific specialities in the finest detail (see, for example, Lemaine et al, 1976).

Here is a personal view of a few of the milestones which have already been passed:

In April 1992, the first 'Simulating Societies' workshop was held. Twenty-four people turned up, knowing hardly anything about each others' work, yet all interested in using multi-agent simulations for social science problems (see Gilbert and Doran, 1994). As one does, at the end of the meeting, those present promised to meet again -- and did so for the second of what became a series of workshops, first in Siena, Italy (Gilbert and Conte, 1995) and then in Boca Raton, USA in 1995, and in Cortona, Italy in 1997. At each workshop, the papers became theoretically and methodologically more firmly grounded as the participants became more skilled and more confident in the methods they were using.

In 1995, a meeting was held at the Internationale Begegnungs- und Forschungszentrum für Informatik, Schoß Dagstuhl in Germany. This introduced many others in Europe to the role of computer simulation in the social sciences (Troitzsch et al 1996; see also the report of an earlier meeting in Germany, Hegselmann, Mueller and Troitzsch 1996).

Meanwhile, in the United States, the Santa Fe Institute was developing ideas about complexity and applying them to economics. Much of this work was based on the use of computer modelling.

In September 1997, the first international conference, on computer simulation and the social sciences (ICSS&SS) was held at Cortona. The proceedings (Conte, Hegselmann and Terna 1997) argue that the application of computer simulation can help to achieve a disciplinary synthesis among the social sciences, because this new methodology can provide theoretical benefits. It can:

- assist with answering questions relating to the emergence of behavioural patterns, structures and processes, such as cooperation, coordination, norms, the market and so on.

- help with overcoming the difficulties of conventional analytical methods, especially when one needs to deal with non-linear dynamics and social complexity.

- illuminate the understanding of self-organising and decentralised social phenomena.

- And finally, in January 1998, here is a journal for this emerging field.

Until now, most of the research work in the field has been published in edited collections (for example, those cited above). However, such collections typically take a long time between submission of the manuscript and eventual publication, and the books are expensive and sometimes difficult to get hold of. The benefits of an electronic journal are that material can be published quickly (always within three months); it is cheap to produce, because there are no media or distribution costs; and formats such as colour illustrations and animations are easy to include.

The journal will also publish reviews of books likely to be of interest to our readers. If you know of a recent book which you would like reviewed, or if you would like to review a book yourself, please let us know. A note about the technicalities of using an electronic journal:

Reading articles

Most people only scan articles on screen and then print those that they want to read carefully onto paper. Old-fashioned paper still has great advantages for close reading.

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BOOKS AND JOURNALS
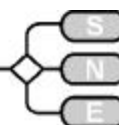
Referencing articles

To reference an article in JASSS, look at the head of the article, where its URL (address) is given. Our articles are not divided into pages (to allow easy downloading and printing), but each paragraph is numbered. This allows you to cite a specific paragraph if you want to quote the article in a publication.

Submitting articles

Submitting papers is easy: you need only provide an electronic copy of a plain text version and any illustrations to the editor. The formatting is done by the journal.

Referred articles are sent to referees and when accepted are published in the next issue (Another advantage of an electronic journal is that there are no page limits; we can therefore always guarantee publication in the next issue).

JASSS has borrowed heavily from a prior and very successful electronic journal, Sociological Research Online. We thank those who have designed, developed, edited and funded Sociological Research Online for their inspiration and practical assistance.

Contents of Issue 3

http://jasss.soc.surrey.ac.uk/3/3/contents.html
Evelien P.H. Zeggelink, Henk de Vos and Donald Elsas: Reciprocal altruism and group formation: The degree of segmentation of reciprocal altruists who prefer 'old-helping-partners' Peter Tucker and Isobel Fletcher: Simulating Household Waste Management Behaviours Part 2: Home Composting

Forum

- Alexander Repenning, Andri Ioannidou and John Zola: AgentSheets: End-User Programmable Simulations
- Joaquim Carvalho: Using AgentSheets to teach simulation to undergraduate students

Reviews

Distributed Artificial Intelligence Meets Machine Learning: Learning in Multi-Agent Environments; Edited by Gerhard Weiss; Reviewed by Paul D. Scott

Modeling Rationality, Morality and Evolution; Edited by Peter A. Danielson; Reviewed by Shepley Orr

Simulation for the Social Scientist; Nigel Gilbert and Klaus G. Troitzsch; Reviewed by Andrea Schertler

Issue 29/30

SIMPRA - Simulation Practice and Theory

EUROSIM scientific journal Simulation Practice and Theory Simulation Practice and Theory (SIMPRA) is EUROSIM's scientific journal, published by Elsevier Science B.V. It publishes high quality contributions on modelling and simulation. Instructions to authors and other information can be found on the journal's on

http://www.elsevier.nl/locate/simpra

Forthcoming papers - October, 2000

- S. Jimenez-Garcia, M.E. Magana, J.S. Bebitez-Read, J. Martinez Carballido, Modeling, simulation and gain scheduling control of large radio telescopes.
- M.R. Manavazhi, Simulating the construction of structures - an automated approach.
- L. Thevenon, J.M. Flaus, Modular representation of complex hybrid systems: application to the simulation of batch
- N. Mebarki, P. Castagna, An approach based on hotelling's test for multicriteria stochastic simulation optimization (MOSIM special issue).
- S. Julia, R. Valette, Real time scheduling of batch systems (MOSIM special issue).
- P.A. Wilcox, A.G. Burger, P. Hoare, Advanced distributed simulation: a review of developments and their application for data collection and analysis.
- O. Darcan, A.R. Kaylan, Load balanced implementation of standard clock method.
- M. Jemli, M. Boussak, M. Gossa, M.B.A. Kamoun, Fail-safe digital implementation of indirect field oriented controlled induction motor drive.
- S. Andradottir, V.M. Bier, Applying Bayesian ideas in simulation.
- S. Minegishi, D. Thiel, System dynamics modelling and simulation of a particular food supply chain (MOSIM special issue).
- S.A.A. Abdul Ghani, A. Aroussi, Simulation of road vehicle natural environment in a climatic wind tunnel.

Submissions of manuscripts

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2651 LE Berkel en Rodenrijs, The Netherlands

If you have any information, suggestions for contributions (technical notes, developments, comparison solutions), questions etc. please contact a member of the editorial board or the editor-in-chief.

Last but not least - Some Jokes

The best way to fill up empty space - in life as in the SNE is a little bit of humor…

* 2+2=5 for large values of 2.
* A civil enginner, a physicist and a mathematician are handed their food in an unopened can during a survival training; in addition they get a notepad and a pencil. The civil engineer keeps throwing the can against a wall until it opens. The physicist looks at his can and broods over it; finally he punches the weakest spot of the can with his pencil which then opens immediately. The mathematician is found dead. On the notepad he has written: "Assuming the can to be open..."
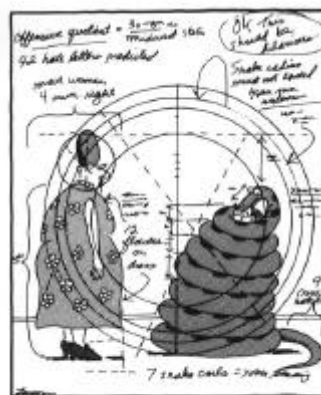
Revealing some of the mathematical computations every cartoonist must know.