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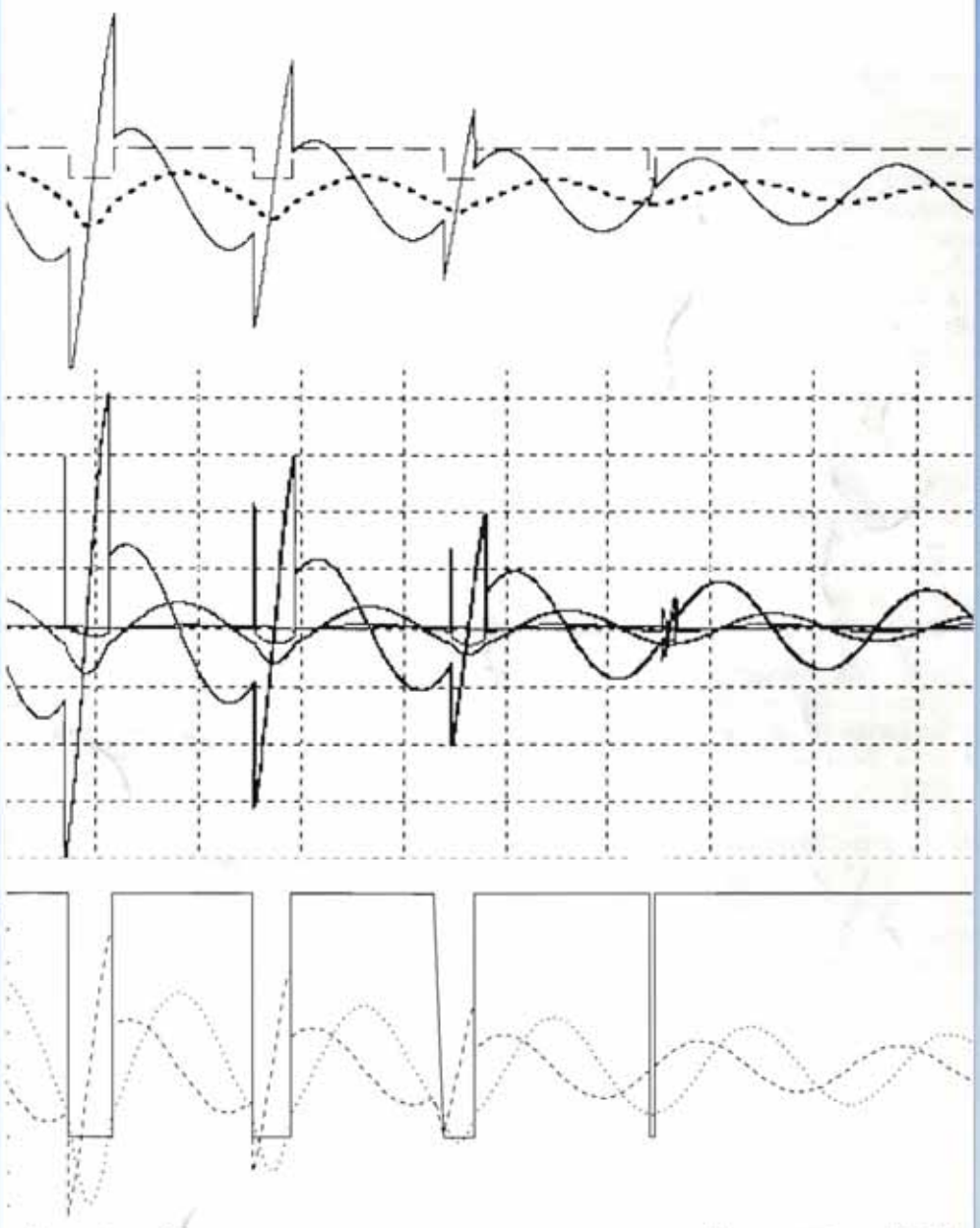

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A EUROPEAN FORUM ON SIMULATION ACTIVITIES

Table of Contents

Readership Information

EUROSIM - Simulation News Europe is published on behalf of EUROSIM (the Federation of European Simulation Societies) three times a year by the "ARGE Simulation News", a non-profit working group. Circulation is 2100. EUROSIM -Simulation News Europe (SNE) is distributed by all member societies to their individual members (as part of the membership services). It is also included in the scientific journal "Simulation Practice and Theory" (SIMPRA).

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If you have any contributions, remarks, suggestions, etc. please contact the editors per mail, fax, or email. For file transfer please use the incoming directory of the ftp-server. Deadline for the next issue will be February 10, 1997.

Editors of the EUROSIM societies, responsible for news and conference announcements of their societies (please contact them if you have contributions concerning a particular society): AES: J. Giron-Sierra, ASIM: I. Bausch-Gall, CROSSIM: V. Ceric, CSSS: M. Alexik, DBSS: J. Zuidervaart, FRANCOSIM: M. Lebrun, HSS: A. Jávor, ISCS: M. Colajanni, SIMS: E. K. Puska, SLOSIM: B. Zupancic, UKSS: R. Cheng (full addresses see societies).

The production of the newsletter is financed by advertisements and grants covering current expenses for editing, running of the editorial office, promotion, maintenance of the EUROSIM WWW server and other editorial expenses.

Editorial

The series of reports on the Special Interest Sessions at the EUROSIM'95 Congress in Vienna is completed with two reports in this issue. We especially thank the session organisers for providing these reports.

The Dining Philosophers problem of the EUROSIM comparisons is redefined as Comparison 10, in order to allow to compare the results and evaluate them. All readers are invited to take the challenge of solving one of the comparisons. The title page shows results of solutions of Comparison 7 (Constrained Pendulum).

We appreciate that we receive so many books to review in our newsletter. We worked our way through the stack of not yet reviewed books and publish seven book reviews in this issue.

We would like to draw your attention to the section "Software Development" where amongst others the project of the design of a new language for physical modeling is presented.

On the EUROSIM WWW server (http://eurosim.tuwien.ac.at/) you can find information on the EUROSIM societies, information about the comparisons, a calendar of events and many things more. As usual we thank all who have contributed to this issue.

F. Breitenecker, I. Husinsky

Aims and Scope

The journal EUROSIM - Simulation News Europe (abbreviated SNE) publishes information related to modelling and simulation. It is distributed to all members of European member societies and to other simulation societies or to individuals.

SNE's aims are: to inform about new developments in simulation methodologies, software and hardware (esp. in Europe) and to report news from European simulation societies and European simulation events.

SNE contains news on EUROSIM, on the EUROSIM societies, on other international simulation societies and groups (and societies from related areas), on European simulation centers, and contains a calendar of events.

Each SNE publishes essays dealing with new developments in a particular area and reports on software and hardware developments. Furthermore, there are book reviews and industry news.

A special series on simulation comparisons (EUROSIM comparisons) gives a comprehensive overview on features and developments of simulation software and hardware, including parallelisation techniques.

General information, parts of the news section and information about the EUROSIM comparisons may be found on EUROSIM/ARGESIM's WWW server (http://eurosim.tuwien.ac.at/).

All contributions are selected and may be edited by the editors of the journal.

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Worldwide Sales and Support

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. Two kinds of membership, full membership and observer membership, are available. At present EUROSIM has nine full members and two observer members:

- ASIM - Arbeitsgemeinschaft Simulation (Austria, Germany, Switzerland),
- 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),
- UKSS -United Kingdom Simulation Society (UK).

- AES -Asociación Española de Simulación (Spain), observer member,
- CROSSIM - Croatian Society for Simulation Modelling (Croatia), observer member.

EUROSIM is governed by a **Board** consisting of one representative of each member society, plus the organizer of the last EUROSIM congress and the organizer of the coming EUROSIM congress. The Board elects officers, who are at present:

- K. Juslin (SIMS) - president,
- F. Breitenecker (ASIM) - past president,
- R. Zobel (UKSS) - secretary,
- L. Dekker (DBSS) - treasurer.

EUROSIM's journal **EUROSIM - Simulation News Europe** (SNE) publishes information on simulation news in Europe and trends and developments in simulation, including reports of EUROSIM's member societies. **Simulation Practice and Theory** (SIMPRA), EUROSIM's scientific journal, publishes high quality contributions on modelling and simulation.

Every three years the **EUROSIM Congress**, the "family meeting" of the European simulationists takes place, hosted by one of the member societies. First joint meetings of the societies took place in Aachen (1983) and Antwerpen (1986). EUROSIM was formally established on the occasion of the European Simulation Congress in Edinburgh (1989), organized by UKSS. The next EUROSIM congress was held in Capri (1992, ISCS). In 1995 the EUROSIM'95 congress was organised by ASIM in Vienna, gathering about 500 specialists in modelling and simulation. The next congress, EUROSIM'98, will be held in Helsinki, Finland, hosted by SIMS. DBSS will organize the EUROSIM congress in 2001 in Delft, The Netherlands.

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All your ideas are welcome.
Don't hesitate to contact us:

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EUROSIM'95 Special Interest Sessions

The EUROSIM'95 Congress, which took place in Vienna in September 1995, featured several "Special Interest Sessions" with emphasis on specific up-to-date simulation topics. This issue of *EUROSIM - Simulation News Europe* completes this series of reports.

Mathematical Modelling and Applications

Mathematical modelling, especially goal-oriented modelling, is a valuable tool for solving real world problems. However, correct application is not at all easy. Mathematical models have to be reliable and should be of appropriate complexity i. e. they have to account for all influences and interactions being important for the problem to be solved. But, at the same time such a model should not reflect more details than indeed necessary. Hence, a saying of A. Einstein should be in the mind of every modeller "Everything should be made as simple as possible, but not simpler".

There are two major goals

- Design
- Prediction - Knowledge

In engineering, in most cases both goals are present - there is a design task and the designer has to demonstrate that the design will work in a satisfactory way. Hence, quite frequently, two or more models are used in parallel. A rather simple one for the design and a more detailed one for demonstrating the quality of the design e. g. by simulation. Therefore, there are close connections between modelling and simulation. This can be recognized already in the relatively old VDI guideline 3633 stating that "a simulation is the reproduction of a dynamic process in a model in order to get knowledge which can be transferred to reality". Or, as Minsky states "A model M for a system S and an experiment E is anything to which E can be applied in order to answer questions about S".

A mathematical model need not consist of traditional mathematical formulas only, i. e. of equations and inequalities to describe the dynamics of a certain process or system. Also graphs and nets can be used and successful engineering applications of e. g. Bond graphs or Petri nets prove their usefulness for combined systems or for discrete event systems, respectively. Hence, a mathematical model of a system is a description in abstract mathematical formulation. It uses mathematical symbols and manipulates them according to mathematical laws only. Such an abstract formulation becomes a model by relating symbols and system (process) quantities. Such a model is adequate if it is suitable for solving the underlying problem.

It is a frequent saying that mathematical modelling is at the same time art and science. And every successful modeller knows quite well, that modelling is an iterative process, i. e. in most practical situations a suitable model is not developed in one single step, but modification such as linearization, order reduction, neglection of small terms etc. on one side and addition of - mainly nonlinear - terms in order to account for interactions, for modelling uncertainties etc. on the other side.

Hence, successful modelling is based primarily on experience. Therefore, engineers and scientists involved in modelling usually are interested not only in existing models and modelling approaches of systems of exactly that nature they are dealing with but also in modelling approaches and ideas being successfully used in different areas of application.

Therefore, it was not surprising that a relatively great number of colleagues responded to the invitation to contribute to a special interest session on mathematical modelling in general and especially in view of control and subsequent simulations. As a consequence, a string of four such sessions resulted covering the main modelling approaches of actual interest as well as a great variety of applications. Thus, also the importance of appropriate modelling for control design can be recognized.

In order to allow some insight into what is going on in this area, a list with the contributions to the four individual subsessions is given in the sequel:

1) Modelling and simulation of control systems

Mathematical Modelling of Grain Ventilation (A. Aboltins)

Fuzzy Modelling of Gas Supply Networks (U. V. Döllen, M. Schlothane)

Systematical Modeling of a Sorting Process with Petri Nets (N. Plött, W. Bär)

Impact of Modeling and Integration Scheme on Simulation of MOS-Circuits (M. Günther, G. Denk, U. Feldmann)

About Models of Robot Manipulators for Decoupled Joint Control (D. Galardini, R. Gorez)

2) Controlled systems in aerospace engineering

Modelling Limitations for Helicopter Flight Control System Design (D. Murray-Smith)

Realistic Modelling in Aerospace Engineering - A Challenge for Optimal Control (K. Chudej)

From Generic Aircraft Models towards LFTs Based Parametric Uncertainties Descriptions (A. Varga, D. Moormann, D. Kaesbauer, G. Grübel)

3) Controlled systems with delays and discrete events

Design and Simulation of Logical-Dynamical Systems (R. Büttner, H. Ehrlich, C. Nitu, A. Pretschner)

Condition/event systems: a powerful paradigm for timed and untimed discrete models of technical sytems (S. Engell, S. Kowalewski, B. H. Krogh, J. Preußig)

On the Inclusion of Models in Generating Control Action for Discrete-Event Systems (D. Franke)

On Object-Oriented Modelling of Abrupt Changes (S. E. Mattsson)

Simulation of Characteristic Delays in Multivariable Control Systems Using WCBSL (N. E. Gough, I. H. Ting, G. M. Dimirovski, O. L. Iliev)

4) Biotechnical and process control systems

Self-organizing Modelling of Biotechnological Batch and Fed-Batch Fermentations (K. D. Bettenhausen, P. Marenbach)

On Modelling of Boundary Conditions for Fixed-Bed Bioreactors (S. Julien, J. P. Babary, M. N. Nihtilä)

Mathematical Modelling of a Chemical Semi-Batch Reaction (P. Bogaerts, A. Cuvelier, Ph. Arte, R. Hanus)

Object-Oriented Process Modelling Applied to a Reactor (B. A. Foss, S. O. Wasbø, O. Øgård)

All published in
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Parallel Simulation

Many papers have been submitted for the Special Interest Session "Parallel Simulation". It turned out immediately that it is difficult to classify the papers in terms of "parallel simulation", distributed (interactive) simulation, high performance simulation etc. - these terms seem to build up a Babylonian tower.

It was tried to classify the papers into three sessions. The session "Parallel Simulation" was intended to present papers describing research that leads to the spreading of the workload induced by a single program over multiple (mostly identical) processors mostly assembled into a single system. Generally all of them perform the same portion of code concurrently with different slices of the data matrix or under the control of different sets of parameters. Each processor may have its own local memory or they may share the same global memory. This session consisted of 12 papers ([1] - [12]).

Another view of parallelism is introduced by means of "Distributed Simulation". This session should mainly concentrate on simulations that use multiple cooperating systems (some possibly being themselves multiprocessors) tied together in a logical cluster. They all contribute in a coordinated effort to the solution of a single problem, but each of them may run a different code which is part of the overall task. This session consisted of 10 papers ([13] - [22]).

There is a smooth transition between parallel and distributed forms of processing, and the choice of the "drawer" in which the paper has been put may sometimes seem arbitrary. Especially [2] surely fits equally into both.

Simulation is mainly an interactive task. Papers dealing mainly with the interactive aspect were put together into a session "Distributed Interactive Simulation", one also might have called it "Distributed Parallel Simulation". This session mainly presented implementations of interactive software and related applications ([23] - [26]). The section closed with a paper on the EUROSIM Comparisons on Parallel Simulation Techniques ([27]), which summarised the solutions sent in up to now and tried to evaluate the efficiency of spreading the workload over multiple processors. Depending on the type and size of the problem, the elapsed time to solution may have a minimum for a specific number of processors, or it may turn out that it just increases if the program is parallelized.

But contributions on parallel and / or distributed simulation could be also found in the application sessions, showing the wide range of investigations, using also new techniques and methodologies: Petri nets, groundwater flow etc. ([28] - [40]).

It is nearly impossible to summarise results, common denominators etc. That shows that "Parallel Simulation" (as most general term) is an area of recent interest, with a big need, with a growing area of application, and with a broad spectrum of methodologies (where at present one cannot decide which methodology would suit best).

The common denominators that can be extracted are

- that the message passing paradigm (implemented through PVM or MPI) is the choice for software that is to run on any kind of distributed memory architecture,
- that there are almost no tools available for parallelizing and tuning new or migrated programs,
- that the potential for parallel or distributed simulations is nevertheless estimated high.

An invited lecture [41] dealt with the mapping of the application architecture to the parallel system architec-

ture, being one of the key issues in designing new simulation models for parallel execution, or in the migration of existing models to parallel platforms.

A last remark: parallelization is used to speed up simulation, and the system's parallel structure may help in setting up a proper parallelization - but on a von Neumann's computer architecture. The discussion in [42] whether true real life parallelism can be mapped to a parallel computer architecture introduced a healthy scepticism in the all too often careless acceptance of the computational results of simulation runs.

References

Session Parallel Simulation

[1] Parallel Qualitative Simulation (Platzner M., Rinner B., Weiss R.)
[2] The Strings that Tie Simulators together: the Message Passing Paradigm as Instantiated by PVM (Weisz W.)
[3] Massive Parallel Models of Net Dynamic Objects (Anoprienko A., Feldmann L., Lapko V., Svyatnyj V., Bräunl T., Reuter A., Zeitz M.)
[4] Adaptive Model Parallelism Exploitation in Parallel Simulation (Ferscha A.)
[5] A Massively Parallel Simulation Method for Parabolic and Hyperbolic Systems (Dekker L., Brok S.W.)
[6] Parallel Simulation of Complex Technical Processes (Schneider F., Wienand F., Rake H.)
[7] Scalability Analysis of Parallel Finite Element Methods using Performance Simulation (van Gemund A.J.C., Lin H.X.)
[8] A Parallel Algorithm for the Simulation of Energy Networks (Weinmann J.)
[9] A Hybrid Parallel Simulation System for Transputers (Ruplitsch M., Steger Ch., Weiß R.)
[10] A New Concept for Shared Memory Update in Parallel DSP and Transputer Systems (Brenner E., Weiss R.)
[11] Simulating the Simulator: Deterministic PRAM Simulation on a Mesh Simulator (Meyer U., Sibeyn J.F.)
[12] The Real-Time Simulation of Multiframe System on Multiprocessors (Du T., Huang K., Zha Y.)

Session Distributed Simulation

[13] Object-Oriented Database Technology Applied to Distributed Simulation (Heywood P., MacKechnie G., Pooley R., Thanisch P.)
[14] A Distributed, Object-Oriented Simulation System based on Hints (Böszörményi L., Stopper A.)
[15] Rollback Overhead Reduction Methods for Time Warp Distributed Simulation (Balsamo S., Manconi C.)
[16] Large-Scale Simulations of Dynamic Open Systems (Corbin M.J., Sapaty P.S.)
[17] Coupling Simulators with the Model Concept and PVM (Schuster G., Breitenecker F.)
[18] A Distributed Simulation Approach to Manufacturing Control Using Time-Warp (Vojdani N.)
[19] Maintenance Simulation: Software Issues (Luk C.H., Jette M.A.)
[20] Object Oriented Realization of a Parallel Discrete Event Simulator (Reisinger G., Praehofer H.)
[21] Object-Oriented Communication for Distributed Discrete Event Simulation (Necker T.)
[22] A Simulation Tool for Distributed Systems Using Test Sequences (Castanet R., Chevrier C.)

Session Distributed Interactive Simulation

[23] Distributed and Parallel Simulation in an Interactive Environment (Pawletta S., Pawletta T., Drewelow W.)
[24] Specification Driven Distributed Simulation Using PrT-Nets (Srivastava A., Lakhanpal D.K., Jain V., Bhatt P.C.P)
[25] A Basic Architecture for the Development of a Distributed Interactive Simulator (Deegener M., John W., Kühnapfel B., Löhr M., Lux G., Wirth H.)
[26] Application of FSIMUL-P for Parallel Simulation in a Heterogeneous Computer Environment (Dellwig P.)
[27] Efficiency of Parallel Strategies in Simulation. Results of the EUROSIM Parallel Comparison (Breitenecker F., Husinsky I., Schuster G.)

Applications Session

[28] Parallel Evolutionary Algorithms for Simulation Optimization (Pierreval H., Tautou L., Bzeznik B.)
[29] Simulations of Crossbar Switches for Parallel Systems (Grammatikakis M.D., Kraetzl M.)
[30] Parallel and Distributed Simulation of Atmospheric Pollutant Dispersion (Kaltenbach J., Schmidt F.)
[31] Parallel Simulation of Groundwater Flow (Gräber P.W.)
[32] New Developments in the Parallel Simulation System mosis (Schuster G., Breitenecker F.)
[33] Parallel Simulation of Mobile Networks Using Time Warp (Sköld S., Rönngren R., Liljenstam M., Ayani R.)
[34] Parallel Simulation of Mobile Communication Networks Using (Porras J., Harju J., Ikonen J.)
[35] Multi-Agent Systems Based Distributed Intelligent Simulation - A Case Study (Belo O., Neves J.)
[36] Analyzing the Timing Error in Distributed Simulations of Asynchronous Computer Architectures (Theodoropoulos G., Woods J.V.)
[37] Simulation Study of Multitasking and Resequencing in a Homogeneous Distributed System (Karatza H.D.)
[38] Distributed Object-Oriented Simulation Environment: An Implementation of Time Warp Using PVM (Beraldi R., Nigro L.)
[39] Stochastic Modelling of Mobile Distributed Systems (Irmscher K.)
[40] Simulation of Distributed Simulation with Timed Colored Petri Nets (Paulussen R.R., Somers L.J.)

Invited / Special Lecture

[41] Modelling for Parallel Simulation: Possibilities and Pitfalls (Sloot P.M.A.)
[42] True Simulation of Real Parallel Processes is Impossible. A Proof by the Five Dining Philosophers (Fuss H.)

All in Proceedings or late Paper Volume
EUROSIM'95 Simulation Congress - Proceedings. Eds. F. Breitenecker, I. Husinsky; Elsevier, Amsterdam (1995), ISBN 0-444-82241-0

EUROSIM'95 Simulation Congress - Late Paper Volume. Eds. F. Breitenecker, I. Husinsky; ARGESIM Report No. 1, ARGESIM Vienna (1995), ISBN 3-901608-01-X

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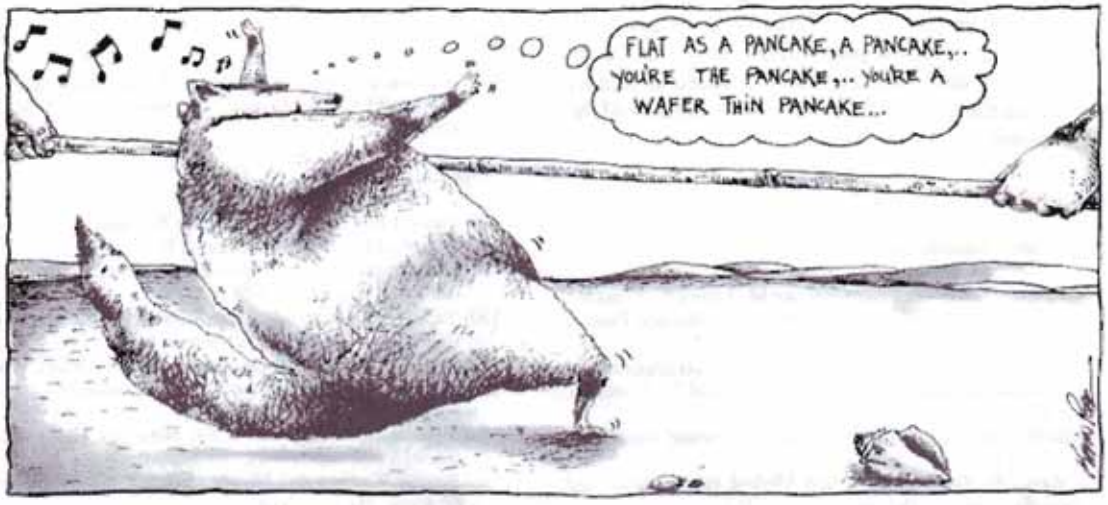

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ASIM

ASIM (*Arbeitsgemeinschaft Simulation*) is the association for simulation in the German speaking area. ASIM was founded in 1981 and has now about 680 individual members.

ASIM is also organized as "*Fachausschuß Simulation* (FA 4.5)" of GI (*Gesellschaft für Informatik*). Very recently a reorganization of ASIM was confirmed by the GI Board. The "*Arbeitskreise*" of ASIM are upgraded as so-called "*Fachgruppen*" (FG), having more efficiency, influence, etc. ASIM consists now of eight "*Fachgruppen*" (FG 1 to FG 8), and is cooperating with a *Fachgruppe* dealing with environmental issues (FGE).

Report on ASIM'96 - *10. Symposium Simulationstechnik*, Dresden, September 1996

DUAL Zentrum GmbH Dresden organized the conference ASIM'96. During the last years, DUAL Zentrum GmbH has set up an efficient simulation potential in Sachsen and beyond it. ASIM'96 was supported by HTW (FH) Dresden, VDI-BV-Dresden, ESPRIT-CLUB Sachsen, SCS and others. The scientific programme covered six main topics in six plenary papers, in more than 10 invited papers and over 100 contributed papers, which were held in parallel sessions. About 300 experts from more than 10 countries ensured a highly interesting discussion of all problems of modelling and simulation. Talks and discussions were finally supplemented by the presence of over 20 exhibitors presenting the latest software tools of simulation. Two poster sessions, six tutorials and over 10 user group meetings provided a practice-oriented basis for further discussions and the breaks were used by the participants to discuss with old friends and to make new friends. The proceedings include the papers lectured at the symposium. Amongst others the following problems were discussed:

- A highly important topic of modelling and simulation in industry is to simulate as realistically as possible complex business processes and their optimization according to different criteria such as cost minimization, reduction of production run and maximum utilization of resources.
- The interdisciplinary cooperation of simulation experts, economists and industrial users for the solution of complex problems has been continuously increasing and was pointed out several times during discussions. The starting point was the successful complex solution of the simulation and optimization for an integrated product and process design in industry by directly coupling ARIS business process modelling system developed by Prof. Scheer, IDS in Saarbrücken and the ISSOP optimization system of DUAL-Zentrum GmbH Dresden.
- Novel and highly interesting is the use of simulation and optimization tools in the multimedia world and communication systems in order to obtain the correct information as efficient as possible in time and cost.
- Promising for the conservation of natural resources and environment are the advanced considerations of different scenarios by means of mathematical models and high-performance simulation software.
- Modern modelling methods undoubtedly include the multiagent systems and the reproduction of branch-oriented reference models.
- The modelling language VHDL-AMS will hopefully help to develop analog and mixed-signal models independently from a specific software tool and to exchange such models between different software tools.

Dresden, as the capital of Sachsen, invited the participants to walk through the town and enjoy the beautiful views and art treasures. An interesting walk through the historical part of Dresden, a visit of the *Semper Oper* surrounded the scientific program. The main social event, a boat trip on the river Elbe, with excellent food and entertainment by Jazz music helped all participants to keep the Symposium ASIM'96 as a long lasting memory.

W. Krug, H. Krug, D. Henze

Elections of the ASIM Board

At ASIM'96 in Dresden a new ASIM Board was elected. 15 persons were candidates for the 8 directly elected positions of the ASIM Board. The ASIM members, who participated at the meeting, elected the following persons into the Board (in alphabetical order):

Bausch-Gall, Breitenecker, Hrdliczka,
Kampe, Krug, Möller, Schäfer, Wenzel

Speaker and vice-speaker will be elected from these persons at the next meeting of the board end of November. Minutes of the election meeting with detailed results of the election will be published in the *ASIM Jahresbericht* or in the *ASIM Nachrichten.*

ASIM Conference in Dortmund 1997

The next annual ASIM conference, **ASIM'97**, the *11. Symposium Simulationstechnik*, will be organized by Prof. Axel Kuhn and Dipl.-Inform. Sigrid Wenzel, Fraunhofer Institute, Dortmund and Prof. Heinz Beilner, University of Dortmund. The event will be held on November 11 - 14th, 1997, in Dortmund, Germany. The programme will include User Group Meet-

ings, Tutorials, Parallel Sessions, Invited Papers, Industrial Forums and Sessions about actual simulation research programs. During the conference (November 12 - 14th, 1997) the first *European Exhibition Simulation and Visualization, S+V*, will take place at the Westfalenhalle, in Dortmund. About 50 exhibitors of simulation and visualization software are expected.

For information please contact: Dipl.-Inform. Sigrid Wenzel, Fraunhofer-Institut für Materialfluß und Logistik, Joseph-von-Fraunhofer-Straße 2-4, D-44227 Dortmund, Email: wenzel@iml.fhg.de

ASIM Book Series

The ASIM book series on Advanced Simulation is published in two different tracks.

Track A: ***Fortschritte in der Simulationstechnik***, published by Vieweg at Wiesbaden, Germany. Already 8 books have been published in this series. Several more are planned to appear in the near future with focus on:

- Status Reports, presenting the state of the art in simulation within each individual ASIM Working Group. These handbooks will be updated according to advances in simulation.
- Compendiums on simulation with general interest to the simulation community.
- Proceedings of the annual ASIM symposium.

Track B: ***Fortschrittsberichte Simulation***, published by ARGESIM at Vienna, Austria. This new publication series is a forum for

- Monographs on recent developments (e.g. PhD thesis, habilitation thesis).
- Workshop Proceedings of ASIM Working Groups.
- Descriptions of simulation tools and their application, User Guides.

The first two books of this series are now available:

C. Westerkamp: *Anwendung der Mehrgrößen-Parameterschätzung zur Simulation von linearen passiven Netzwerken.* ISBN 3-901 608-51-6.

M. Salzmann: *Genetische Algorithmen in diskreten Simulationen.* ISBN 3-901 608-52-4.

The price is DM 40 plus mailing cost; with DM 10 reduction for ASIM members. Send orders to Dr. Ingrid Bausch-Gall. For detailed information or if you are interested to publish in the series, please contact the editors:
Prof. Dr. G. Kampe, Fachhochschule Esslingen, Flandernstr. 101, D-73732 Esslingen, Fax: +49-711-397-4212, Email: kampe@ti.fht-esslingen.de;
Prof. Dr. D. P.F.Möller, TU Clausthal;
Prof. Dr. F. Breitenecker, TU Vienna.

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Further contact addresses are given in the reports of the working groups.

ASIM Meetings to come

January 15, 1997: Meeting of the working group "*Simulation in Produktion und Logistik*" at the University of Kassel, Institute of Prof. Reinhardt. Contact: Sigrid Wenzel.

March 3-4, 1997: Joint meeting of the working groups "*Simulation Technischer Systeme*" and "*Simulationsmethoden und -sprachen für verteilte Systeme und parallele Prozesse*" at University in Rostock, Institute of Prof. Tavangarian. Contact: Dr. Ingrid Bausch-Gall.

March 3-5, 1997: *6. Symposium "Simulation als betriebliche Entscheidungshilfe"* in Braunlage. Contact: Prof. Hummeltenberg.

April 17-19, 1997: *7. Ebernburger Gespräch*, joint meeting of the working groups "*Simulation in Biologie, Medizin und Ökologie*", "*Simulationssoftware und -hardware*" and "*Simulation und künstliche Intelligenz*" Contact: Prof. Richter, Prof. Möller, Prof. Breitenecker, Prof. Szczerbicka.

June 5-6, 1997: Meeting of the Working Group "*Simulation von Verkehrssystemen*" in Ratingen at MANNESMANN Datenverarbeitung. Contact: K.H. Münch.

November 11-14, 1997: *ASIM'97: 11. Symposium Simulationstechnik*, the annual ASIM-conference, detailed information see above.

Meetings with ASIM participation

March 6-7, 1997: *Simulation und Animation'97*, Magdeburg. Contact: Petra Specht, Universität Magdeburg, FIN-ISG, Postfach 4120, D-39016 Magdeburg, Tel: +49 391 67-12868, Email: tagung@ isg.cs.uni-magdeburg.de

Working Groups (*Fachgruppen* FG)

"Simulationsmethoden und -sprachen für verteilte Systeme und parallele Prozesse" (FG 1)

The main topics of the working group "Parallel Processes" are all modelling and simulation aspects of parallel and distributed systems: description methods and languages, parallel and distributed simulation, partitioning for parallelization, performance analysis, distributed computer systems, communication and synchronization principles. The last events were the 10th workshop "Simulation of Distributed Systems and Parallel Processes" (the proceedings have just been published as *ASIM-Mitteilungen, Heft 50*) and a meeting "Performance Analysis of Distributed Systems" (the proceedings are in preparation). Both meetings had 35 and 30 participants, respectively, and took place at Dresden, in cooperation with the Fraunhofer Institute of Integrated Circuits (Department for Design Automation) and with the Dresden University of Technology.

The next meeting will be held together with the working group "*Simulation Technischer Systeme*" on March 3-4, 1997 at Universität Rostock. The working group will organize several talks on Monday afternoon and a so-called "*Arbeitsgespräch*" on Tuesday morning. Those who are interested to give a talk, please contact:

Speaker: Dr.-Ing. Peter Schwarz, Fraunhofer-Institut IIS/EAS, Zeunerstr. 38, D-01069 Dresden Tel: +49-351 4640 730, Fax: +49-351 4640 703, Email: schwarz@eas.iis.fhg.de
Vice-speaker: Dr. Hans Fuss, GMD, D-53731 St. Augustin Tel: +49-2241 14 3125, Fax: +49-2241 14 3006, Email: fuss@cartan.gmd.de

FG 2, FG 3, FG 4

The 7th Ebernburg Working Conference (*7. **Ebernburger Gespräch***), titled "*Soft Computing: Möglichkeiten eines Paradigmenwechsels für dynamische Systeme in Medizin, Biologie und Ökologie*" will be held as joint meeting of the working groups "*Simulation in Medizin, Biologie und Ökologie*", "*Simulation und künstliche Intelligenz*" und "*Simulationssoft- und -hardware*" from April 17-19, 1997 at the castle Ebernburg at Bad Münster am Stein-Ebernburg. The main subject will be Soft Computing (fuzzy systems, neural nets, genetic algorithms) - new challenge in modelling and simulation. Please contact Prof. Möller, Prof. Breitenecker or Prof. Szczerbicka.

"Simulationssoftware und -hardware" (FG 2)

Speaker: Prof. Dr.-Ing. Dietmar P.F. Möller, TU Clausthal, Institut für Informatik, Erzstraße 1, D-38678 Clausthal-Zellerfeld, Tel: +49-5323 72 2402, 2504, Fax: +49-5323 72 3572
Vice-speaker: Prof. Dr. Felix Breitenecker, TU Wien, Abt. Simulationstechnik, Wiedner Hauptstraße 8-10, A-1040 Wien, Tel: +43-1 58801 5374, Fax: +43-1 587 4211, Email: Felix.Breitenecker@tuwien.ac.at

"Simulation und künstliche Intelligenz" (FG 3)

Speaker: Prof. Dr.-Ing. Helena Szczerbicka, Universität Bremen, Rechnerarchitektur und Modellierung, Fachbereich 3 - Informatik, Postfach 33 04 40, D-28334 Bremen, Tel: +49-421 218 7389 or 7390, Fax +49-421 2187385, Email: helena@informatik.uni-bremen.de
Vice-speaker: Dr. Thomas Uthmann, Johannes-Gutenberg-Universität Mainz, Institut für Informatik, Staudingerweg 9, D-55099 Mainz, Tel: +49-6131 39-3610, Fax +49-6131 39-3534, Email: uthmann@informatik.uni-mainz.de

"Simulation in Medizin, Biologie und Ökologie" (FG 4)

Speaker: Prof. Dr. Otto Richter, TU Braunschweig, Institut für Geographie und Geoökologie, Langer Kamp 19c, D-38106 Braunschweig, Tel: +49-531 391 5627, Fax: +49-531 391 8170
Vice-speaker: Prof. Dr. Björn Gottwald, Universität Freiburg, Fakultät für Biologie, Schänzlestraße 1, D-79104 Freiburg, Tel: +49-761 203 2891, Fax: +49-761 203 2894

"Simulation technischer Systeme" (FG 5)

The next meeting of the working group will be held together with the working group "*Simulationsmethoden und -sprachen für verteilte Systeme und parallele Prozesse*" at the institute of Prof. Dj. Tavangarian at Universität Rostock on March 3-4, 1997. On Monday afternoon the hosting institute will present its research activities, more other plenary talks are planned. A meeting of the working group is planned to prepare the subjects of the next meeting, the participation of the working group at the annual conference and a planned status report to be published in the ASIM book series. Monday evening will be a social evening, usually in a restaurant to leave participants enough time for further conversation. Last year in Ulm, so-called "*Arbeitsgespräche*" have been very well accepted. *Arbeitsgespräche* focus on a specific subject and allow thorough and open discussions. They are not only thought to present final results but also to discuss open questions. To offer an interesting subject for almost all participants, we will organize several *Arbeitsgespräche* in parallel sessions on Tuesday morning. Currently planned are *Arbeitsgespräche* on Electronics (*SPICE Anwendergruppe*), VHDL and VHDL-AMS and on simulation in engineering education. The meeting will close with a visit of the maritime museum in Rostock on Tuesday afternoon.

Speaker: Dr. Ingrid Bausch-Gall, BAUSCH-GALL GmbH, Wohlfartstraße 21b, D-80939 München, Tel: +49-89 3232625, Fax: +49-89 3231063, Email: 100564.302@compuserve.com
Vice-speaker: Ewald Hessel, Hella KG Hueck&Co., Abt. EL-R, Werk II, Beckumer Straße, D-59552 Lippstadt, Tel: +49-2941 38 8572, Fax: +49-2941 38 8427, Email: hessel@hella.de

"Simulation in Produktion und Logistik" (FG 6)

The last event organized by the ASIM working group "*Simulation in Produktion und Logistik*" was the Working Group Conference "*Simulation - Anwendernutzen und Zukunftsaspekte*", held on June 11 - 13th, 1996, in Dortmund, Germany. The conference programme contained different sections concerning a) simulation technology in organizations, in logistics and material flow, b) aspects of simulation methods in planning and operation, c) a workshop "*Was interessiert den Fabrikplaner das Produkt?*", d) different logistics business games.

In the scope of this event the ASIM working group organized, together with the GI-Fachgruppe 4.1.4 "*Graphische Simulation und Animation*", a workshop titled "*Visualisierungsverfahren beim Einsatz der Simulationstechnik in Produktion und Logistik*" on June 11th, 1996. This workshop was a forum to discuss different methods and application possibilities of visualization in discrete event simulation. About 30 persons visited this visualization workshop; the conference had more than 90 participants and about 10 exhibitors.

During the conference, on June 12th, 1996, the ASIM working group held its meeting. Current activities of the working group are a comprehensive survey about simulation in education and the production of a new book titled "*Anwendungsorientierte Fallbeispielsammlungen*", which will be published in 1997 in the series "*Fortschritte in der Simulationstechnik*", Vieweg Verlag, Wiesbaden, Germany. The book will contain several simulation studies and projects and will give an overview of the actual simulation standards. It will specifically address potential users of simulation.

The next working group meeting is planned on January 15th, 1997, at the University of Kassel at the institute of Prof. Reinhardt. For detailed information please contact: Dipl.-Inform. Sigrid Wenzel, Fraunhofer-Institut für Materialfluß und Logistik, Joseph-von-Fraunhofer-Straße 2-4, D-44227 Dortmund, Email: wenzel@iml.fhg.de

Speaker: Prof. Dr.-Ing. A. Kuhn, Fraunhofer-Institut für Materialfluß und Logistik, Joseph-von-Fraunhofer-Straße 2-4, D-44227 Dortmund, Tel: +49-231 9743 132, Fax: +49-231 9743 234

Simulation kontinuierlicher Systeme
Simulationskurs bei CCG
(Carl-Cranz-Gesellschaft)

2. - 4. April 1997 in Oberpfaffenhofen bei München

Der Kurs richtet sich an Mitarbeiter in Industrie, Forschung und Entwicklung, die dieses Fachgebiet (näher) kennenlernen wollen. Dieser bereits traditionelle Kurs wurde für 1997 neu bearbeitet, u.a. werden Simulatorkopplung, AHDL-Ansätze und Automatische Modellbildung behandelt.

Auskünfte: Carl-Crantz-Gesellschaft e.V., Postfach 1112, D-82235 Oberpfaffenhofen, Tel: +49-8153 282413, Fax: +49-8153 281345 oder bei den Vortragenden I. Bausch-Gall und F. Breitenecker (Adressen siehe ASIM-Teil).

"Simulation in der Betriebswirtschaft" (FG 7)

On March 3-5, 1997, the 6th Symposium "Simulation for Managerial Decision Support - New Tools and Approaches in Practice" will take place in cooperation with the German Society for Operations Research (DGOR) and the Society for Computer Science (GI) at the Maritim Hotel Braunlage (Harz Mountains), as all other symposiums before. Participation fee includes room and board as well as free admittance to all facilities of this four-star hotel. At this biennial symposium, experts and professionals from industry, science and public services meet to increase the exchange of experience on the application of simulation in business administration and neighbouring fields. Software vendors present their new modelling and development tools. For a report on the 5th symposium see EUROSIM Simulation News Europe, July 1995. Conference language is German, contributions in English will be also accepted. The papers and presentations will be complemented by a management game and an excursion. The accepted papers will be published in the proceedings which will be distributed to all participants at the beginning of the symposium. Deadlines are: December 20th, 1996 for lectures, February 14th, 1997 for other applications. For further information please contact:

Speaker: Prof. Dr. W. Hummeltenberg, Universität Hamburg, Institut für Wirtschaftsinformatik, Max-Brauer-Allee 60, D-22765 Hamburg, Tel.: +49-40-41 23-40 23, Fax: +49-40-41 23-64 41, Email: wi@mba.uni-hamburg.de
Vice-speaker: Prof. Dr. Biethahn, Georg-August-University of Göttingen, Platz der Göttinger Sieben 5, D-37073 Göttingen.

"Simulation von Verkehrssystemen" (FG 8)

The working group met in June 1996 in Zürich to discuss the subject *"Simulation zur strategischen Verkehrsplanung"*. Results will be published in *ASIM-Mitteilungen No. 55*. The next working group meeting will be on June 5-6, 1997 at MANNESMANN Datenverarbeitung in Ratingen. Subject will be *"Informationsmanagement und Logistik im Verkehr"*.

Speaker: Karl-Heinz Münch, SIEMENS AG, Bereich VT2 SYS, Ackerstraße 22, D- 38126 Braunschweig, Tel: +49-531 226 2225, Fax: +49-531 226 4305

"Werkzeuge für die Modellbildung und Simulation in Umweltanwendungen" (FGE)

Speaker: Prof.Dr.habil. Rolf Grützner, University of Rostock, Dept. of Computer Science, WG Modeling and Simulation, Albert-Einstein-Str.21, D-18056 Rostock, Tel: +49-381 4983369, Fax: +49 381 4983426, Email: gruet@informatik. uni-rostock.de

Ingrid Bausch-Gall, Felix Breitenecker

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CROSSIM

CROSSIM (The Croatian Society for Simulation Modelling) was founded in March 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.

Membership: CROSSIM currently has 51 individual members. The annual membership fee is equivalent to 8 German marks for regular members, and 2 German marks for students.

Activities

- Co-organizing the 19th International Conference "**Information Technology Interfaces**" ITI '97, to be held in Pula, Croatia, from 17-20 June 1997. The conference has the strong modelling and simulation session and an international invited lecturer in the field of simulation (Prof. Ivan Futo, Hungary).
- Co-organizing the **5th Operations Research Conference** in Croatia, held from 1-3 October 1996 in Rovinj, Croatia.
- Organizing a simulation seminar which is held at the Faculty of Economics, University of Zagreb.
- Work on several scientific projects in discrete and continuous 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.

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(member of the Editorial Board of SNE)

V. Ceric

CSSS

General Information

On September 16, 1996 the regular Board meeting of our society was held at Zabreh na Morave, Czech republic, during the International workshop "Advanced Simulation of Systems (AdSS)" with the following agenda: report on activities of the past period; report of the supervisory board; report on the EUROSIM co-operation; planned activities for the years 1997 and 1998. Currently CSSS has around 60 members in the two national societies, Czech and Slovak Simulation Societies. CSSS is a member of EUROSIM.

Steering Committee: J. Stefan, Tech. University Ostrava (Chairman); M. Alexik, University of Zilina (Vice chair); J. Snorek, Czech Technical University Prague; J. Lauber, Economy University Prague; E. Kindler, Czech Technical University Prague; Z. Rabova, Technical University Brno; M. Sujansky, Technical University Kosice; J. Luhan, Research Institute TESTCOM Prague (secretary).

Past Events

CSSS organised three conferences in the second half of the year 1996: The 18th International workshop "**Advanced Simulation of Systems**" was held on September 17-19, 1996 in the Moravian city Zabreh na Morave, Czech republic. There were 47 visitors from the Czech and Slovak republics and 5 from abroad. The proceedings volume has 275 pages (47 authors). Most of the articles are written in English, all articles have English abstracts.

The 12th International Conference on "**Process Control and Simulation**" (ASRTP'96) took place on September 10-13, 1996 in Kosice - Zlata Idka, Slovak republic.

The conference had the following topics: Measurements and Monitoring Systems * Modelling and Simulation * Process Management and Control * Production Management and Control * Information Technology * Knowledge based Process Control Management * Real-time Process Control and Management. There were 50 participants from the Czech and Slovak republics and 35 from UK, Poland, Rumania and Hungary. 28 presentations were given in the section Modelling and Simulation. The conference language was English, Slovak and Czech. Chairman of the international program committee was Prof. Ivan Plander, Academy of Science, Bratislava, Slovak republic.

The international conference "**Electronic Computer and Informatics**" was on September 26-27, 1996 in Herlany, Slovak republic.

The chairman of the conference was prof. M. Jelsina, Technical University Kosice. The conference had the following topics: Algorithms and Theoretical Informatics * Information Systems * Modelling and Simulation of Systems. 30 participants came from the Czech and Slovak republics and 5 from Poland and Rumania. In the section Modelling and Simulation there were 9 presentations.

Coming Events

The 31st International Conference on "**Modelling and Simulation of Systems**" (MOSYS'97) will be held on April 28-30, 1997 in Hradec na Moravici, Czech republic. The chairman of the international organizing committee is Dr. Jan Stefan. Hradec na Moravici is an old Moravian town with a castle from the 13th century.

The 19th international workshop "**Advanced Simulation of Systems**" will be held on September 16-18, 1997 in the Moravian city of Krnov, Czech republic. Chairman of the workshop is Dr. J. Stefan, TU Ostrava.

The second International workshop "**Modelling and Simulation in Management and Control**" will be held on October 8-9, 1997 in Zilina - Sulov, Slovak republic. The chairman of the workshop is prof. M. Alexik, University of Zilina, Slovak republic.

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M. Alexik

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 the other members and is affiliated with SCS International and IMACS.

Steering Committee

Chairman: L. Dekker, Delft University of Technology, Vice Chairman: A.W. Heemink, Delft University of Technology, Member: W. Smit, AKZO NOBEL, Secretary/Treasurer: J.C. Zuidervaart, Delft University of Technology.

DBSS Membership

Both corporate entities (companies, institutes, etc.) and individuals are welcome to join DBSS as full corporate or individual member. 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.

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

Dutch Benelux Simulation Society Secretariat:
Computing Centre, P.O. Box 354
NL-2600 AJ Delft, The Netherlands
Tel: +31-15 2785698, Fax: 31-15 2783787
Email: Zuidervaart@rc.tudelft.nl
(member of the Editorial Board of SNE)

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

Past Events

Last June the international EUROSIM conference "**HPCN challenges in telecomp and telecom, parallel simulation of complex systems and large-scale applications**" has taken place. Both the scientific and the organizing committee appreciate that a hundred participants from many countries all over the world have come to Delft. The programme was divided in four sessions: * High performance computing - development * High performance computing and simulation applications * High performance networking * Multi processor communication structures and systems and two special sessions:

High performance computing in environmental modelling: For densely populated countries, the modelling of the transport of pollutants and the simulations of pollution reduction scenarios are becoming more and more important in view of the growing awareness of damaging effects. Mathematical modelling and computer simulation provide the tools to determine, as accurately as possible, levels at which pollution should be reduced. Furthermore, these models are also important for real-time prediction problems. However, still

many real life applications require computer resources beyond existing capabilities. From the various contributions in this session it becomes clear that High Performance Computing has now reached the point where engineers and applied scientists can apply parallel processing for solving large scale environmental problems.

Industry session: The marriage of computing and communication will accelerate innovation in industry and create new businesses, especially in the services sector. New distributed applications like simulation, datamining, sensor data processing and transaction processing, visualisation pose new challenges and requirements for integration of High Performance Computing and Networking. In this session industry has given it views on HPCN and presented their ideas and requirements in this field. Also some case studies from a technology user point of view were included. Papers were presented by large international companies and TNO, the Dutch Organisation of Applied Research. Of these two special sessions separate booklets are published.

Furthermore a commercial and a scientific exhibition have taken place. In total twenty-seven applicants from several organizations were at the exhibition either with a demonstration or with a poster presentation. Descriptions of the demonstrations can be found in the conference proceedings.

A Parallel Computing Contest for undergraduate and graduate students has been organised as part of the conference. The following submissions were received: * Hidden surface removal on parallel architecture by Pascal Langlais from Canada * Parallel implementation of numerical method for ODE systems based on the Cayley transform by Evgeniya Gorshkova from Ukraine * "D&C with reconfiguration" algorithm in a nutshell by P.R. Water from The Netherlands * Parallelisation of a classical molecular dynamics code by Roman Geus from Switzerland * Parallel search algorithm for the detection of irregular structures by Renata M. Aiex from Brasil * Large scale finite element fluid analysis by Massively Parallel Processors by Yasushi Nakabayashi from Japan. The members of the jury: N. Hekster, IBM; J.M. van Kats, HP/Convex; H.X. Lin, TU Delft; M.R.T. Roest, TU Delft, L. Timmermans, CRAY Research; J.C. Zuidervaart, TU Delft judged that the final winner of the contest was Renata M. Aiex. One can find detailed descriptions of the submissions, criteria and decisions of the jury in the proceedings of the conference.

The last day of the conference a panel discussion was organised. Chairman was J. Halin from Switzerland; panel members C.H. Cap, Switzerland; E. Shapiro, USA; T.E. Tezduyar, USA.

The Organizing Committee thanks all the people who were involved in one way or another in the success of the conference.

A book of abstracts of the presentations has been published before the conference. This booklet is available for the price of dfl. 30,- (excl. mailing costs).

Coming Events

DBSS will organise during the first two days of the EUROSIM 98 Congress (organised by the SIMS society in Helsinki, Finland) a parallel session with the provisional title "**The impact of HPCN on parallel simulation**".

The provisional scientific committee for this session: J. Bruin, FEL TNO, NL, L. Dekker, TU Delft, NL; J. Halin, ETH Zurich, Switzerland, A.W. Heemink, TU Delft, NL; J. Keane, University of Manchester, UK; H.X. Lin, TU Delft, NL; E. Shapiro, USA; W. Smit, AKZO NOBEL, NL; J.C. Zuidervaart, TU Delft, NL.

For more information, please contact the EUROSIM '98 congress office: P.O. Box 1301, FIN-02044 VTT; Fax: +358 9 456 6754; Email: eurosim98@vtt.fi

Furthermore DBSS is pleased to announce that their offer to organise the EUROSIM 2001 congress in Delft, The Netherlands, was accepted in June by the EUROSIM Board.

J.C. Zuidervaart

FRANCOSIM

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

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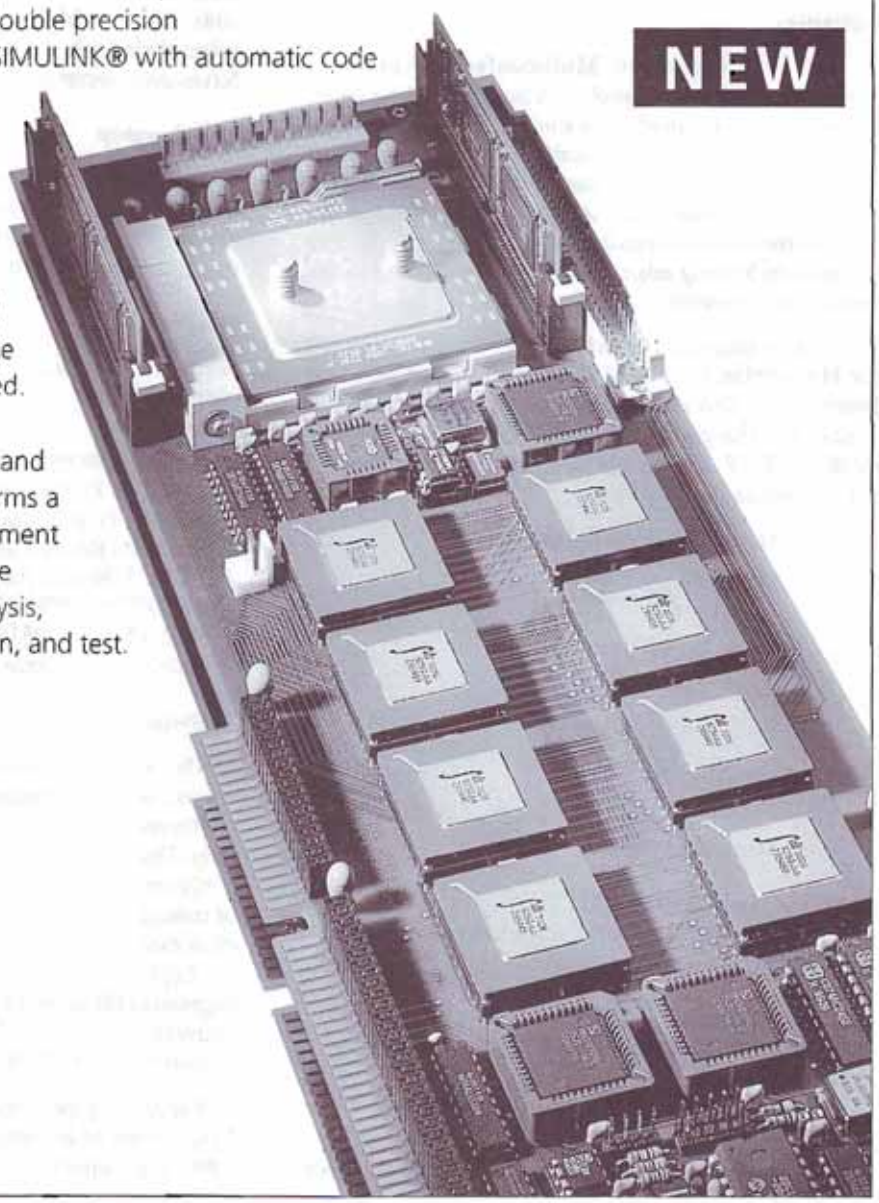

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HSS

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

The **10th European Multiconference** of SCS, where the Hungarian Simulation Society was co-sponsor and the chairman of our society acted as the General Chairman was held with success. A large number of participants from many countries all over the World attended the Conference. Among the participants were some of the most outstanding scientists of the field. The tutorials in leading edge areas have contributed to the success of the event.

Another important event was the official opening of the **Hungarian Center of the International McLeod Institute of Simulation Sciences** to the activities of which the Hungarian Simulation Society is directly related as Prof. András Jávor, chairman of our society, was nominated as its director.

HSS has chosen a logo for the society:

Contact Address

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(member of the Editorial Board of SNE)

A. Jávor

ISCS

General Information

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 the following persons: Franco Maceri (chairman), Felice Cennamo (vice-chairman), Vincenzo Grassi (treasurer), Mario Savastano (secretary).

Membership

At present ISCS counts 132 members: 6 institutional, 4 honorary, 120 regular and 2 affiliate. Charges per annum are Lit. 30,000 for regular and affiliated members and Lit. 400,000 for institutional members.

Contact Address

For further information or application for membership, please contact:

ISCS
c/o Dipartimento di Informatica,
Sistemi e Produzione
Università di Roma "Tor Vergata"
Via della Ricerca Scientifica
I-00133, Roma, Italy
Tel: +39 6 7259 4477
Fax: +39 6 2020519
Email: grassi@info.utovrm.it

Activities

The steering committee of ISCS is presently involved in the organization of ISCS '96, the annual conference of the ISCS that will take place in Rome, Italy, December 12-13, 1996. Topics of interest for the conference are methodological and application aspects of simulation. Interested people should submit 4 copies of an extended abstract (max. 2 A4 pages) of their paper by September 20, 1996, to the following address: Segreteria ISCS '96 Dipartimento di Ingegneria Civile Università di Roma "Tor Vergata" Via della Ricerca Scientifica I-00133, Roma, Italy.

Papers may be written in Italian, English or French. Notification of acceptance will be sent by October 20, 1996, and camera-ready copies (max. 6 A4 pages) will

be due on November 15, 1996. Accepted papers will be published in the conference proceedings, and a limited number of papers will be selected for possible publication in the Journal "Simulation Practice and Theory". For further information please contact prof. Vincenzo Grassi at the address above, or connect to: http://russell.ce.utovrm.it/~ISCS

Notice to ISCS members: The annual meeting of ISCS members is scheduled to be held in December 1996 in Rome, during the ISCS '96 Conference. On that occasion, we are planning to organize a meeting between members coming from academia and industry.

Vincenzo Grassi

SIMS

The Scandinavian Simulation Society, SIMS, has at present nearly 300 members from Denmark, Finland, Norway and Sweden. For 37 years SIMS has served as the regional society in Scandinavia, gathering individuals and organisations involved in simulation. The activities have been concentrated on arranging annual meetings and courses, delivery of information letters, and co-operation at European and international level in the field of simulation.

New Board for SIMS

The board of SIMS consists of:

Jonas Dyberg, ISI, Sweden (Chair); Torleif Iversen, SINTEF, Norway (Board member); Bernt Lie, Hogskolen i Telemark, Norway (Board member); Esko Juuso, University of Oulu, Finland (Board member); Hannu Sippola, Finland (Board member); Niels Houbak, DTU, Denmark (Board member); Paul Rathje, Danfoss, Denmark (Board member).

Lars Lidner, Volvo PV, Sweden, continues as Treasurer, and Kaj Juslin, VTT, Finland, as the SIMS contact person to other societies.

How to join SIMS

Just send an informal application or recommendation for membership to the SIMS contact person:

Torleif Iversen
INTEF Electronics and Cybernetics
Automatic Control
N-7034 Trondheim, Norway
Tel. +47 73 59 44 74, Fax. +47 73 59 43 99
Email: sims@ecy.sintef.no

E.K. Puska

SLOSIM

The Slovenian Society for Simulation and Modelling has currently 84 members, both from Slovenian Universities and from industrial companies.

Recent Activities

SLOSIM was one of the co-operative societies in the organization of the traditional **Electrotechnical and Computer Conference ERK'96** in Portoroz, Slovenia (Adriatic Coast). There were more than 200 participants.

The program consisted of 6 invited lectures, 29 conference sessions, a student session and several panel discussions. The session part consisted of 29 sessions from the following subjects: Electronics (2 sessions, 15 papers), Telecommunication (2, 14), Automatic control (3, 20), Simulation (3, 20), Power engineering (4, 28), Measurement (4, 31), Computer science (4, 35), Artificial intelligence (1, 9), Robotics (1, 10), Pattern recognition (2, 15), and Biomedical engineering (2, 16). A special student session with 12 papers also took place. The winner will represent Slovenia in the IEEE regain 8 competition.

SLOSIM was responsible for simulation sessions. The papers were divided into the following three sessions:

Simulation (6 presentations): The presentations partially deal with simulation tools which enable also some modern extensions e.g. real time simulation, parallel simulation, object oriented approach, intelligent supervision etc. and partially with more application oriented simulation studies.

Identification (7 presentations): The papers mainly deal with qualitative modelling and with modelling approaches for fault diagnosis.

Modeling (7 presentations): The papers deal with methodologies for the modeling of continuous as well as discrete event systems (object oriented approaches, neural nets, fuzzy models) and with some modeling applications in different areas.

There were two interesting panel discussions: How to improve links between academic and industry research and development activities. Didactic methods in the electrotechnical and computer science education.

On October 3., 1996 SLOSIM organized a lecture **G2: A comprehensive environment for creating intelligent production management systems** which was given by Rainer Decker and Susanne Dolzer, GenSym GmbH, Munich. The presentation covered two sections. The first section presented G2's technologies and how these technologies work together. The second section described the overall approach to delivering intelligent applications with G2.

The regular annual assembly is planned for the middle of November with a group presentation event (Group for biocybernetics from the Faculty of Electrical Engineering, Ljubljana).

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or slosim@fe.uni-lj.si
(member of the Editorial Board of SNE)

Borut Zupancic

Obituary

Prof. John Lewis Hay.
Died aged 53 in November 1995

It is with sadness that I write about the untimely death of a good friend of long standing. I believe that I first met John at a UK Simulation Council meeting in Manchester in 1970, when he worked in the Department of Electronics and Electrical Engineering at Salford University. He was involved then of course with simulation, an activity and interest which stayed with him. He subsequently became Senior Lecturer and then Professor, the latter also through his active involvement with SCS, the Society for Computer Simulation.

He contributed much to simulation and the UK Society over the years and became very actively involved with Dr. John Pearce, Prof. Roy Crosbie, Geoff Mortimer and of course with his wife Beryl and others, with the development and applications of ESL, the European Space Agency Simulation Language. John left the University to work full time at his company iSIM, International Simulation Limited in Salford University Business Park where he worked on projects with the European Space Agency and with the associated companies Cogsys Limited and Solutions Foundry Limited.

I met John on many occasions at one day meetings and simulation conferences around Europe. We always had good happy productive meetings and discussions. More recently I personally became involved with John and ESL through some collaborative work, initially with the Hubble Space Telescope and subsequently with applications of ESL in distributed interactive simulation (DIS).

John was a pleasant quiet man, and a very competent international professional who was both a good long term friend and colleague to all who new him. He is and will continue to be greatly missed. It is very appropriate that close to the anniversary of his death, a one day event is being held at Salford University where Johns' friends, colleagues and family will remember him and discuss with admiration and affection his life, work and future prospects for his excellent products.

Richard Zobel, October 1996

UKSS

The United Kingdom Simulation Society is undergoing some reorganisation this year. Prof Graham Birtwhistle and Prof Paul Luker have joined the Committee. We are sorry to lose Chris Bowyer as Membership Secretary. The new Membership Secretary is:

Dr Gwyn Jones
Dept of Computing and Information Systems
London Guildhall University
100 Minories
London EC3N 1JY
Tel: +44 171 3201716
Fax: +44 171 3201717
Email: gjones@lgu.ac.uk

Individual subscriptions remain at 20 GBP per year. Please contact Gwyn Jones for further information on membership.

At the time of writing the next **One day meeting** is scheduled for 31st Oct at Salford University. The meeting is a Memorial one in tribute to **John Hay**, who was sadly lost to us this year. The meeting includes a number of interesting papers covering space simulation and continuous simulation in his honour. A detailed report of the meeting will be given in the next issue of SNE.

UKSIM 97

The arrangements for the next National Meeting of the Society due to be held next Easter continue. The title of the Meeting has been changed to avoid confusion with a similar meeting due to be held at about the same time. Our meeting will now be UKSIM 97.

The Venue for the Conference is The Keswick Hotel in the Lake District. The dates are **April 23-25th 1997**. It should not be too late when you receive this issue to submit a late paper.

The Chair for the conference is Graham Birtwhistle, Division of OR and Information Systems, School of Computer Studies, The University, Leeds LS2 9JT, Tel: +44-113 2431751. The Program Chair is Paul Luker, School of Computing Sciences, De Montfort University, Leicester LE1 9BH, Tel: +44-116 257 7488, Fax: +44-116 254 1891, Email: luker@de-montfort.ac.uk Please contact either for further information on the Conference.

Russell Cheng
(Secretary UKSS,
member of the Editorial Board of SNE)

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ACSL Code
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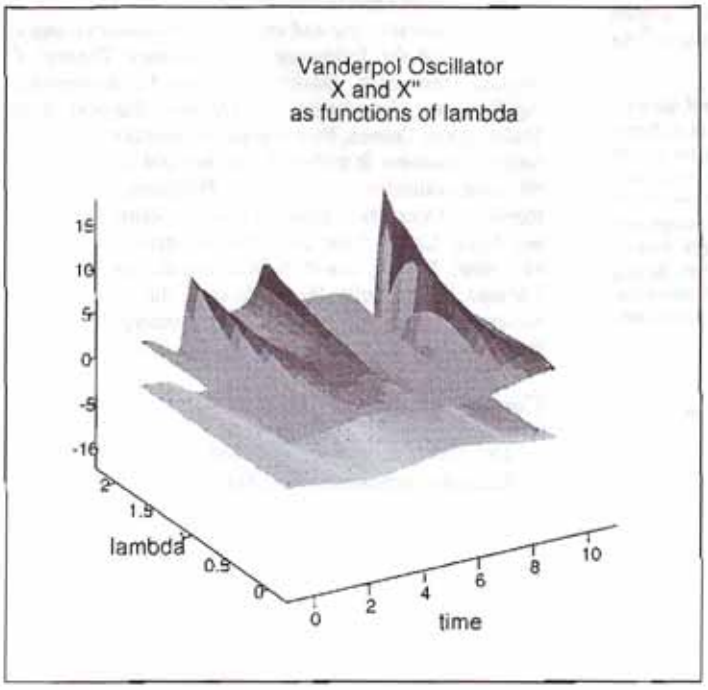

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IMACS

2nd MATHMOD VIENNA

IMACS

February 5–7, 1997
Technical University Vienna, Austria

Sponsors: IMACS (Int. Ass. for Maths. & Comp. in Simul.), Division for Mathematics of Control and Simulation (E114/5) at Technical University Vienna, Technical University Vienna

Cosponsors: IFAC (Int. Fed. for Automatic Control), IAMCM (Int. Ass. for Math. & Comp. Mod.), ASIM (German Speaking Simulation Group), GAMM (Soc. Appl. Math. Mech., Germany), VDI/VDE-GMA (Soc. for Meas. & Autom.), OCG (Austrian Computer Soc.), OEMG (Austrian Math. Soc.) , EUROSIM (Fed. European Simulation Soc.)

Organizer: Division for Mathematics of Control and Simulation (E114/5) at Technical University Vienna

NOC: F. Breitenecker, I. Troch, F. Urbanek

Scope: All aspects of mathematical modelling of all types of systems i. e. of systems which are * dynamic or static * deterministic or stochastic * continuous or discrete * lumped parameter or distributed parameter * linear or nonlinear * or of any other nature.

A wide variety of formal models will be discussed and the term "mathematical model" will include classical models such as differential or difference equations, Markov processes, ARMA models as well as more recent approaches such as Bond graphs or Petri nets. The topics to be discussed will include * modelling theory * processes and methods for model formulation, identification, development, reduction and validation etc. (incl. guidelines and check lists) * automation of modelling and software aids for modelling * modelling for/by simulation * qualitative modelling including fuzzy and iterative approaches to modelling * modular modelling (especially applied to interdisciplinary fields such as mechatronics or controlled environmental systems) * learning networks in modelling * uncertainties in modelling * methodologies for model validation * fitting mathematical models to real processes * the relationship between the modelling approach and problem solutions * comparison of methods for modelling, model reduction and model validation * effects of modelling errors on overall performance of an engineering system (e. g. relationship between modelling and control design) * applications in the field of engineering systems and in natural sciences * applications in other fields (such as environmental systems, biotechnology etc.) * case studies of a comparison for ideas or methods - education in modelling.

Out of some 180 submitted abstracts about 120 scientific papers have been accepted for presentation. In addition, some 15 special sessions with some 70 papers will be held.

Further details can be obtained from:

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Tel: +43-158801-5367, Fax: +43 1 586 29 59

LSS

The international conference "**Simulation, Gaming, Training and Business, Process, Reengineering in Operations**", organized by the Latvian Simulation Society in cooperation with the Institute of Information Technology of the Riga Technical University, the department of Economic Information Systems of the Linköping University, the International Federation of Operational Research Societies (IFORS), the Association of European Operational Research Societies within IFORS, the Swedish Operations Research Society and the Finnish Operations Research Society, was held in Riga, Latvia during September 19-21.

The conference was related to both theoretical and practical aspects of Operational Research and Simulation in the field of manufacturing and services, (Operations), and structured around the following major themes: Theory/ Techniques; Simulation, Business Process Reengineering and Applications; Simulation and Decision-Support Systems; Training and Games; Production; Information and Communication Systems. It gathered together 104 participants from different countries, e.g., Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, Germany, Great Britain, Japan, Latvia, Lithuania, The Netherlands, Poland, P. R. of Chine, Russia, South Korea, Spain, Sweden, Taiwan, Ukraine, USA. During the conference, the Baltic Operations Research Society was established, that incorporates members from Latvia, Lithuania and Estonia.

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Email: merkur@itl.rtu.lv

Conceptual Learning of Sciences Supported by the Simulation of Natural Phenomena

Abstract: The paper gives a brief presentation of simulation concepts used to support the basic principles of conceptual learning. One of the central activities of the CoLoS consortium which has been founded on such principles is the development of highly interactive, computer supported experiments, integrated with experiments. These experiments are in fact executed by the means of digital simulation of natural phenomena. The development of such experiments is highly facilitated by the use of various specialised software tools like xyZET and xdev. The current trends on Internet provide new opportunities which lead to the development of software that is portable across multiple machine architectures, operating systems, and graphical user interfaces.

1. What is Conceptual Learning

The idea of computer supported conceptual learning led to the establishment of a consortium of 12 European and 10 American Universities. Their activities embrace the development of physics courses and other corresponding software. The mission of these activities is to provide the teachers of natural sciences with an access to the new means and methods offered by modern technology and to a deeper understanding of phenomena they teach. This should improve the quality of their teaching and create more enthusiasm for natural sciences among their students.

One of the methods that has been developed by CoLoS is based on the mimicry of nature and its fundamental principles which replaces the solving of mathematical equations. The computer is used for the visualisation of the molecular or atomic behaviour. The teachers or students interacting with the simulated system can obtain a better understanding of the subject.

Such concept of learning can be extended to other fields of natural science. The fundamental principle is to find the basic primitives and then to explore the relations and rules of interaction between them. Such primitives are particles in the field of the quantum physics, atoms and molecules in chemistry, objects in computer science.

The quality of the simulation of more complex systems partially depends on the performances of the computer system being used. Therefore most of the CoLoS experiments are developed for the UNIX operating system and the powerful graphical workstations are mainly used.

The use of the hypertext and further of the WWW provides additional opportunities and possibilities to such courseware. The explanation of phenomena and interactive experiments can be integrated in a well structured courseware and the use of Internet enlarges the possibilities of remote learning based on it.

2. Basic CoLoS Software Tools

One of the most significant CoLoS tools, which permits an easy and highly interactive description of simulated physical situation is xyZET. Basically, it permits construction of the simulated world using particles as the fundamental primitives and defining various forces acting on these particles. The observation of the behaviour of the simulated world is facilitated first of all by an effective 3 dimensional visualisation and by using various graphical and numerical monitors. A deeper understanding of the simulated phenomena is achieved through the on-line experimentation with various parameters concerning the phenomena. Figure 1 shows a typical display obtained during one of such experiments. Several charged particles are dispersed in the space and a equipotential plane is visualised. Of course, the particles interact with their forces of attraction and the form of this plane changes with time.

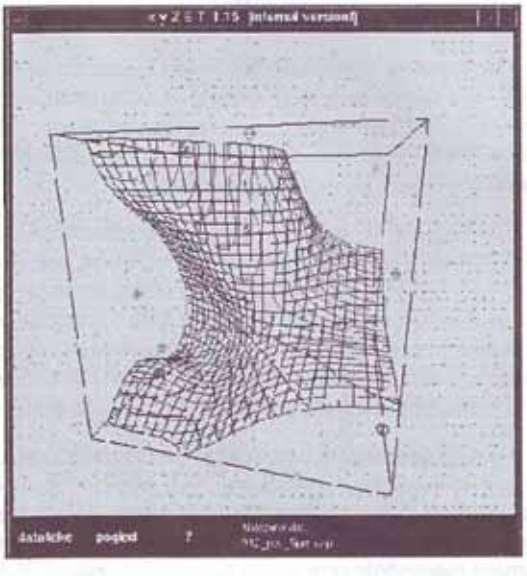

Fig. 1: Example of a graphic display during a simulation with xyZET

xyZET experiments can cooperate with the explaining didactic material which could be prepared and represented in the popular HTML format.

Another basic CoLoS tool is xdev which is in fact an effective, graphically oriented program generator. It runs on several UNIX platforms and in Windows 95 environment. Most of the experiments prepared with xdev have 2D or 3D particles as their primitives. The basic difference between the xyZET ad the xdev approach is that for the development of xdev-based simulations some knowledge of C-level programming is still needed. Therefore xdev should be considered as a development tool for more advanced users. The following figure shows a simulation of a conductor and it visualises the behaviour of charged particles in this conductor.

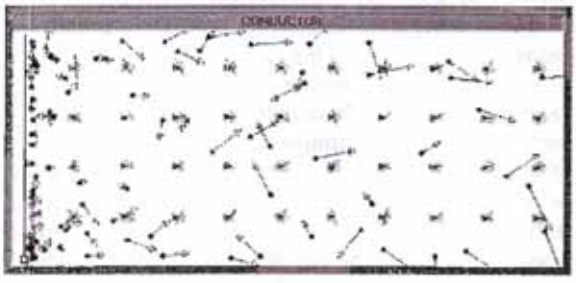

Fig.2: Simulation of charged particles in a conductor, prepared with xdev

The possibility of the interaction of such experiments with some didactic explanation, prepared with hypertext is also possible.

3. Current trends and colos tools

The massive growth of the Internet and the WWW leads to a completely new way of looking at development and distribution of software. Operating on multiple platforms in heterogeneous networks invalidates the traditional schemes of software design.

The needs of distributed, client-server based systems coincide with the paradigms of object-based software. The Java system was emerged to meet these needs. Developing your applications using Java results in software that is portable across multiple machine architectures, operating systems, and graphical user interfaces. With Java, the software development is much easier.

Java programming language is simple and familiar (it is in fact a simplification of C++), so it can be easily learned and used by most programmers. It is object oriented, to take advantage of modern software development methodologies and to fit into distributed client-server applications; multithreaded, for high performance in applications that need to perform multiple concurrent activities, such as multimedia; and interpreted, for maximum portability and dynamic capabilities.

The programming of Java applets can be greatly simplified by using appropriate GUI builders.

The following figure presents an example of the integration of the hypertext and an applet which permits the simulation of a space with particles. The behaviour of these particles can be interactively studied by changing the fields and forces which act on these particles.

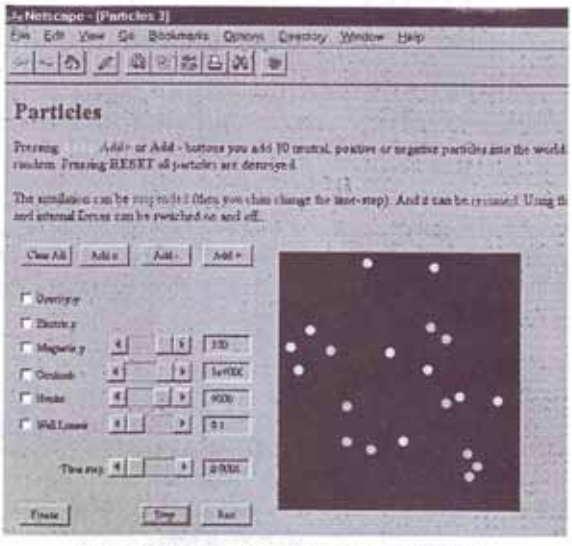

Fig. 3: Simulation of interacting charged particles with Java-applets

4. Conclusion

The development of new, highly interactive, hypertext supported software with Java is of great interest for many application areas and between these for education too. One of the biggest advantages is the portability of developed courseware and platform independence. One of the disadvantages could be the execution speed which is slower in comparison with the traditional programs. The problem is that the compiled code is platform independent and should be therefore interpreted. Its execution times are approximately 40 times greater than usual but in most cases this is not so critical.

References

Central CoLoS server:
http://hpwww.ec-lyon.fr/colosHp

Slovenian CoLoS server:
http://colos1.fri.uni-lj.si/~colos

Sasa Divjak, Faculty of Computer and Information Science, University of Ljubljana, Trzaska 25, SLO - 1000 Ljubljana, Slovenia, Email: sasa@fri.uni-lj.si

Design of a New Language for Physical Modeling

Background

Among several actions that have been defined within the ESPRIT project "Simulation in Europe Basic Research Working Group (SiE-WG)", one is devoted to the design of a new language for physical modeling. There are already several modeling languages for object-oriented, non-causal modeling, such as Dymola, gPROMS, MOSES, NMF, Omola and U.L.M. This working group will attempt to unify the concepts and introduce a common basic syntax and semantics.

Goals

The work will start in the continuous time domain since there is a common mathematical framework in the form of differential-algebraic equations and there are several existing modeling languages based on similar ideas. There is also significant experience of using these languages in various applications. It thus seems to be appropriate to collect all knowledge and experience and design a new unified modeling language or neutral format for model representation. Thus the short range goal is to design a modeling language for differential-algebraic equation (DAE) systems with some discrete event features to handle discontinuities and sampled systems. The design should be extendable in order that the goal can be expanded to design a multi-formalism, multi-domain, general-purpose modeling language.

Design group

The design group presently consists of the following people (previous designs are indicated): Hilding Elmqvist, Dynasim AB, Lund, Sweden (Dymola), Alexandre Jeandel, Gaz de France, Saint Denis, France (U.L.M.), Sven Erik Mattsson, Department of Automatic Control, Lund Institute of Technology, Lund, Sweden (Omola), Per Sahlin, Department of Building Sciences, Royal Institute of Technology, Stockholm, Sweden (NMF), Martin Otter, Institut fuer Robotik und Systemdynamik, DLR Oberpfaffenhofen, Germany (DSblock).

Progress

The progress of the design group is presented on the web: URL: http://www.Dynasim.se/language-design. Requirements, proposals and feedback on the design are very much welcome. A progress report will be presented at the 8th European Simulation Symposium organised by SCS in Genoa, Italy, October 24-26.

Hilding Elmqvist, Dynasim AB, Research Park Ideon, S-223 70 Lund, Sweden, Tel: +46 46 182500, Fax: +46 46 129879, Email: info@Dynasim.se

Book Reviews

Konzeption des Aufbaus eines universell einsetzbaren Simulationssystems (in German)
Thomas Apsel
SCS-Europe, 1996, ISBN 1-56555-089-7

After a short introduction the author starts with a description of the simulation system SIMPLEX II as this thesis has to be seen as a part of the project SIMPLEX.

In the next chapter different groups of users of simulation systems are discussed and then a classification of simulation software from the modelling point of view is given. The next chapter focuses the integration of external applications in a simulation system and - vice versa - the integration of the simulation system in external applications ending with a list of requests to a universal applicable simulation system.

Based on these requests chapter 5 gives a very detailed functional decomposition of such a simulation system. At first the architecture, then the modular structure and the interfaces are specified. Chapter 6 presents the concept of attributed model components that is realised in chapter 7 with an example of a factory. After that preparation chapter 8 contains a specification of the description of attributes of the model components. Then the author applies the concept presented in chapter 6 to different examples.

The comparison of the presented concepts to existing simulation software ends with the statement that different parts of the concept are already realised, but not as sufficient as it would be necessary for really flexible systems. The final chapter 10 summarises the presented concepts and outlines the advantages when they get realised.

If the concepts are really "capable on the hand to increase the numbers of users and on the other hand to extend the area of applications of universal simulation systems" has to be proven in practice.

Johannes Plank, ARGESIM, Dept. Simulation Techniques, TU Vienna, Wiedner Hauptstr. 8-10, A-1040 Vienna, Email: argesim@argesim.tuwien.ac.at

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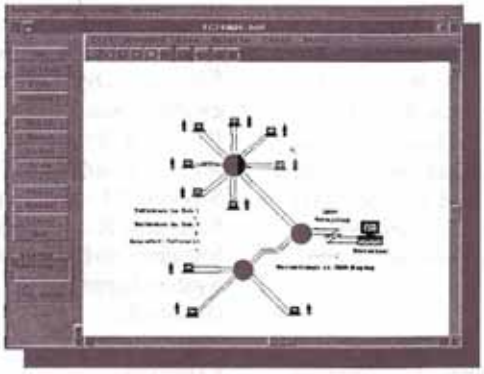

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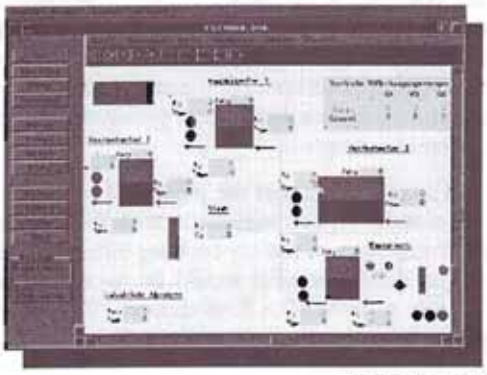

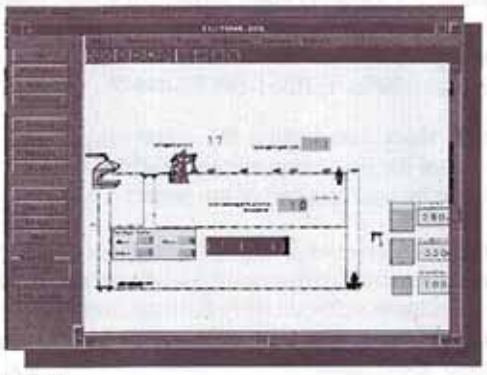

Since developed and tested powerful optimization tools in connection to ARENA by the name of ISSOP (Integration System for Simulation and Optimization).
To obtain further information simply contact Wilfried Krug, Jens Liebelt
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Introduction to Discrete-Time Signals and Systems
R. I. Damper
Chapman and Hall, 1995
ISBN 0-412-47650-9, xv + 268 pages

This introduction to discrete systems and signals is primarily intended for teaching, for instance in conjunction with a first course on this subject, both for lecturers and students. It secondarily may be used as low to medium level introduction into the discussed subject.

After an introduction (chapter 1) and an overview about discrete systems (chapter 2) the z-transform (chapter 3) and infinite impulse response filters (chapter 4) are discussed. The next chapters deal with the discrete Fourier transform (chapter 5), with finite impulse response filters (chapter 6), and with the fast Fourier transform (chapter 7). A chapter on random signals (chapter 8) concludes the contents.

In principle, the contents deal more with signals than system ("systems" are discussed in some minor details in chapter 2, 3 and 8.

It is the author's aim to impart depth of understanding of the key concepts, and therefore no demonstration software was included in this textbook (as now frequently to find in textbooks in technical areas). The reader may judge, whether the absence of such software (in C, or any matrix or signal processing package) is an advantage or disadvantage.

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Introduction to Random Processes in Engineering
A. V. Balakrishnan,
Jon Wiley & Sons, New York 1995
ISBN 0-471-12487-7, 402 + xiii pages

The brief abstract on the back cover promises "an innovative book that demystifies theories, eliminates ambiguities, and provides a solid up-to-date introduction to this important subject". The subject has to be specified in more detail: random processes in communication and control engineering and signal processing - the title of the book is a little misleading (too general).

The author starts with a review of the mathematical background (linear algebra, probability, Fourier series and transforms etc.). The first chapter introduces into basics of random processes, followed by the key concepts of stationary random processes (covariance and spectrum). Chapter 3 and 4 deal with the response of linear systems to random inputs, for discrete as well as for continuous-time models. The next chapters introduce into the ergodic principle and sampling principles.

Chapter 7 studies techniques for digital computer simulation of random processes, as tool for the design process in communication and control. The last chapter "generalises" the investigation on random processes into the Euclidian space: homogeneous random fields, correlation and spectrum.

The book is not written in "quick textbook style", it is more a mathematical book emphasising accuracy and eschewing inaccurate descriptive phrases. On the other hand, the mathematics is kept in balance (no knowledge of too general theories, e.g. measure theory), and application plays a role in the foreground, and simulation techniques are sketched as alternative tools.

Furthermore, the book is written very fluently, and complex matters are described precisely, but as simple as possible. As result, complex theories, algorithms and tools become very familiar.

In summary, the book can be highly recommended for teaching purposes (for lecturers and students) as well as standard introduction into the subject for engineers. It has to be stated that the book really keeps the promise (see above).

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Simplex II - *Das universelle Simulationssystem der neuen Generation auf Unix System V* (in German)
B. Schmidt
SCS-Europe, 1996, ISBN 1-56555-082-X

This book - written in German - is subtitled with "user manual" for SIMPLEX-II.

The first chapter of the book gives general information about SIMPLEX-II, starting with the experiment environment and the model description. The main features of the system are presented with different examples. At the end the structure of SIMPLEX-II is explained shortly.

Some general fundamentals of system analysis, model construction and simulation can be found in the second chapter. The following chapters present SIMPLEX-II starting with the model construction. A lot of examples, some of them are well-known like the prey-predator-model or even comparison 7 from SNE, are the basis for the presentation of SIMPLEX-II.

The chapters 5 and 6 contain information about special features for discrete simulation. For instance

there is a detailed description of observation and representation of simulation results.

Chapter 9 deals with the internal structure of SIMPLEX-II. In the section "Flow Control" the reader gains an insight into the internal scheduling of the simulator. Finally chapter 10 presents the experiment description language of SIMPLEX-II including a section about optimisation.

Although entitled as "User Guide" the book can also be seen as an introduction to simulation for newcomers but is also a profound description of SIMPLEX-II and therefore also very interesting for experienced simulationists. On the other hand the user of SIMPLEX-II, to whom the book is preferably directed to, will not find tables of statements and commands. The book can be recommended for new users but with constraints to the experienced user of SIMPLEX-II.

A remark: unfortunately we cannot find any hint on the availability of the described simulation software, nor information about the developers.

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Genetische Algorithmen in diskreter Simulation (in German)
Salzmann, M.J.
ASIM Fortschrittsberichte, vol.2, 1996
ISBN 3-901608-52-4, 157 + xvi pages

In this book (a PhD thesis) the author eloquently discusses the theory of Genetic Algorithms (GA) in the domain of discrete simulation (DS) and their applications with regard to optimization problems.

Using several examples, the scope of GA is introduced to be found as an optimization tool in-between conventional gradient methods and stochastic Monte-Carlo procedures; the basic elements of GA - such as crossover and mutation techniques - are presented. General comments on DS are followed by a particular treatment of optimization and a theoretical discussion about the interaction of GA and DS. Useful parameter selection methods, the efficiency in respect to development of implementations and solutions for convergence problems are treated then. Furthermore, risks and problems which crase when applying GAs are shown and ways to avoid these problems are given.

The practical part explores examples concerning manufacturing problems to validate the theoretical results. Implementations in three simulation languages (D_SIM, GPSS/H and MicroSaint) are developed and the results are compared in a summary. Parts of the source-codes are attached in appendices.

In our opinion, this treatise is worth being transcribed to the English language for the purpose of reaching wider public.

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Analog Filters
Kendall L. Su
Chapman & Hall, 1996
ISBN 0-412-48200-2, 360 pages

Giving an introduction to analog filters, the purpose of this book is to make students dealing with topics related to signal processing, electronics, circuit theory and applied mathematics familiar with the basic aims of this modern theory. Originally designed as a script for specific lectures this publication raised to be a comprehensive complement to several courses. Within 14 chapters, the theory is developed and illustrated with manifold figures.

Several examples are joining the theoretical chapters which are on one hand presented in the "classic" way; on the other hand MATLAB is used. The reason for the chosen concept is obviously to make the reader common with one of the standard languages of modern simulation by focusing on applications. This seems to be the best method to introduce a computational language.

After a short introduction of analog filters, features of approximation, transformation and network functions are discussed. Furthermore a detailed overview of LC ladders and methods of sensitivity calculation is given. Active, passive and switched capacitor filters, Biquard circuits and higher order filters are treated. Each chapter concludes with a short summary and the reader is confronted with practical problems to improve his knowledge (without solutions). An appendix contains tables of filter functions.

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Computer aided Theory Construction in Social Science
Nicole J. Saam
SCS, 1995
ISBN 1-56555-087-0

The book addresses social scientists who are interested in nonlinear social science as well as computer scientists who want to make themselves acquainted with the peculiarities of modeling complex social systems. This book presents a simulation model, which describes the dynamics of military intervention into the political system of Thailand between 1932 and 1992. It is the aim of the model to reproduce this dynamics and thereby to explain it.

First there is an introduction in computer aided theory construction and instruments of synergetics, followed by a theoretical, dynamical, stochastical, nonlinear, concept driven simulation model, which views the dynamics of political rules as self-organizing phenomenon of a multilevel system: members of the military and civilian elite (micro level) act on the one hand side in dependene of their political, social and economic environment (macro level), on the other hand they influence this environment through their political actions. Subsequently this model is tested for its empirical validity and for its sensitivity.

Although the chosen model is a special one the book gives an interesting insight into a special area.

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Industry News

ACSL Optimize and ACSL BioMed now available

Rapid Data Ltd. is pleased to announce the availability of the ACSL Optimize and ACSL BioMed software packages. These tools extend the capabilities of ACSL, the industry-standard Advanced Continuous Simulation Language.

ACSL Optimize is a package for Optimisation, Parameter Estimation and Sensitivity Analysis. It allows the user to load ACSL models and choose the best values of the model parameters in order to minimise or maximise the result of a simulation (Optimisation); tune the model parameters so that the model output matches experimental data as closely as possible (Parameter Estimation); and determine how sensitive the model is to changes in its parameters (Sensitivity Analysis).

ACSL BioMed is a tool designed for the simulation of small and large scale clinical trials. Protocol designers use these simulations to test various clinical trial designs and perform objective sensitivity analysis on the study's parameters before the trial actually takes place. With ACSL BioMed, a variety of trial assumptions and their expected outcomes are simulated easily.

Contact Rapid Data Ltd, Amelia House, Crescent Road, Worthing, West Sussex, BN11 1RL, United Kingdom, Tel +44 1903 821 266, Fax +44 1903 820 762, Email: info@radata.demon.co.uk, Web page: http://www.radata.demon.co.uk

AutoSimulations releases AutoMod for Windows NT

AutoSimulations Inc.announces the release of its simulation software tool, AutoMod, for Microsoft Windows NT. The AutoMod release is in line with the trend towards implementing Windows NT for industrial software because of NT's ease of use and maintenance, lower hardware and software costs, security reliability and data integrity over an enterprise-wide system. Windows NT supports the OpenGL graphics standard for 3-D rendering and drawing that allows AutoMod to continue to provide high-quality 3-D graphics.

AutoMod for Windows NT is now shipping. AutoMod for Windows 95 will be released for testing upon Microsoft's release of OpenGL on Windows 95. AutoSched for Windows NT, AutoSimulations' finite scheduling tool, is slated for release in October.

Contact: Karen Stanley at +1-801 298-1398, ext. 300 or visit AutoSimulation's World Wide Web site at http://www.autosim.com.

FactoryOPT for automatically generating optimal facility and factory layout designs

Cimtechnologies Corporation announces the release of FactoryOPT, an automatic facility layout generation/optimization tool. FactoryOPT includes a combination of 162 layout algorithms and can consider thousands of relationships using a variety of specified design constraints including space, relationship and material flow data to construct an optimal spanning tree, circular, or block layout in minutes.

Contact: Helena Poist, Director of Marketing and Sales Cimtechnologies Corporation, Tel: +1-515 296-9914, Email: daves@cimtech.com

Powersim 2.5 has arrived

Powersim is a software package for building dynamic models and custom designed business simulators. The software allows to create diagrams that represent a system such as departments, factories or companies, and to develop the diagram into an interactive dynamic model. Powersim can easily be connected to other software programs by utilizing any of its efficient connectivity facilities: APIs, DDE, OLE and Windows Clipboard. System requirements: IBM compatible PC, 80386 or higher, Windows 3.1, NT or 95.

Contact: Powersim AS, Promenaden, Knarvik Senter, PO Box 206, N-5100 Isdalsto, Norway, Tel: +47-56-34 24 00, Fax: +47-56-342401, Email: orders@powersim.no

Comparison of Simulation Software

EUROSIM - Simulation News Europe features a series on comparisons of simulation software. Based on simple, easily comprehensible models special features of modelling and experimentation within simulation languages, also with respect to an application area, are compared.

Features are, for instance: modelling technique, event handling, numerical integration, steady-state calculation, distribution fitting, parameter sweep, output analysis, animation, complex logic strategies, submodels, macros, statistical features etc. Up to now 11 comparisons have been defined.

Comparison 1 (Lithium-Cluster Dynamics under Electron Bombardment, November 1990) deals with a stiff system of 3rd order.

Comparison 2 (Flexible Assembly System, March 1991, comments July 1991) for discrete simulation languages compares features for submodel structures, control strategies, and optimization of process parameters.

Comparison 3 (Analysis of a Generalized Class-E Amplifier, July 1991) focusses on simulation of electronic circuits and requires features for table functions, eigenvalue analysis, and complex experiments.

Comparison 4 (Dining Philosophers I, November 1991) is a more general task involving not only simulation but also different modelling techniques like Petri nets.

Comparison 5 (Two State Model, March 1992, revised July 1992) primarily addresses simulation tools with very high accurracy. It checks in tegration and state event handling with high accurracy.

Comparison 6 (Emergency Department - Follow-up Treatment, November 1992) addresses discrete simulation languages and tests features for modelling, concepts of availability, and complex control strategies.

Comparison 7 (Constrained Pendulum, March 1993) for continuous simulation languages, reviews features for model comparison, state events, and boundary value problems.

Comparison CP1 - Parallel Comparison (March 1994). Three test examples have been chosen to investigate the types of parallelisation techniques best suited to particular types of simulation tasks.

Comparison 8 (Canal-and-Lock System, March 1996) for discrete simulators reviews features for modeling complex logic, which has to be veri fied by deterministic datasets. Also variance reduction capabilities are checked.

Comparison 9 (Fuzzy Control of a Two Tank System, July 1996) asks for modules for fuzzy control or how such modules can be implemented efficiently.

Comparison 10 (Dining Philosophers II, redefinition of comparison 4, November 1996) reviews discrete simulators with respect to simultaneous (concurrent) access to resources and with respect to deadlocks.

We invite all readers to participate in this comparison. Please, simulate the model(s) with any tool of your choice and send a report to the editors in the following form (on diskette, any word processing format, or per email or transfer to our ftp-server):

- short description of the language,
- model description (part of source code, diagram, ...),
- results of the tasks with experimentation comments, max. 1 page. (For publication in *EUROSIM - Simulation News Europe* all contributions that exceed one page will be modified by the editors to fit into one page.) Reports of solutions of the Parallel Comparison should not be more than one and a half page in length.

SNE	Comparison										
	C1	C2	C3	C4	C5	C6	C7	CP 1	C8	C9	C10
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	-	1	-	-	-	2	-			
15	-	-	1	-	1	-	-	-			
16	1	-	-	-	-	-	1	-	Def/1		
17	-	-	1	-	1	-	1	1	1	Def/1	
18	-	-	-	-	-	-	2	2	-	-	Def/1
Total	27	21	15	7	6	5	19	10	2	1	1

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

SNE Editors

Comparison 10: Dining Philosophers II

In SNE 3 the Dining Philosophers problem was formulated as (discrete) comparison C4. Dijkstra [1] had been the first to investigate this problem - which is widely known today - from the perspective of computer science, demonstrating the situation of parallel processes in a computer system which have to share resources. The problem is therefore not only sophisticated, it is more than relevant. It has also been frequently discussed in the literature (e.g. [1], [2], [3]).

The Dining Philosophers' problem is relatively easy to describe, but the philosophers' behaviour may cause interesting problems, including especially concurrent access and deadlock situations: Five philosophers are sitting around a large round table, each with a bowl of Chinese food in front of him. Between periods of meditation they may start eating whenever they want to, with their bowls being filled frequently. But there are only five chopsticks available, one each to the left of each bowl - and for eating Chinese food one needs two chopsticks (figure 1).

Figure 1: Philosophers' table

When a philosopher wants to start eating, he must pick up the chopstick to the left of his bowl and the chopstick to the right of his bowl. He may find, however, that either one or both of the chopsticks are unavailable as it/they is/are being used by the philosopher(s) sitting on his right and left, so he has to wait. Hopefully, none of the philosophers is starving and, for convenience, they may agree on certain strategies to cope with unforeseen situations.

C4-Definition in SNE 3

The previous definition of this comparison [4] did not postulate fixed modelling techniques or tasks to be performed. It proposed different approaches to modelling, analysis and simulation, e.g. event-oriented modelling or Petri nets. Experiments of any kind were appreciated: application of different strategies, model extensions by introducing "waiters", net and deadlock analyses, etc. To date, seven very interesting solutions have been received, which really demonstrate the expected variety in the approaches employed: Petri net tools, discrete simulators, interesting experiments, etc. [5 -11].

The problem is that these solutions cannot be compared with each other, and this comparison therefore cannot be evaluated in the same way as the other comparisons [12]. However, since there is substantial interest in this problem, it was decided to reformulate the comparison, restricting it to simulation in the time domain and fixing certain tasks.

C10: Definition (Redefined C4-Definition)

The redefined comparison reviews i) modular and / or object-oriented model descriptions, ii) simultaneous access to resources, and iii) detection of deadlocks.

The first assumption is that the philosophers agree that a hungry philosopher will first take the chopstick to the left of his bowl, and, once he has picked up this chopstick (maybe after some waiting), will try to get the chopstick to the right of his bowl (which may be available immediately or after some waiting).

But even this strategy will not prevent the following two situations from happening, in which any further action (meditating or eating) becomes impossible.

1. Simultaneous access to one chopstick: one of the hungry philosophers (having already got hold of the chopstick to the left of his own bowl) wants to take the chopstick to the right of his bowl at exactly the same time instant as his right neighbour (who is also hungry) is about to pick up the chopstick to the left of his bowl (which is the chopstick to the right of his left neighbour's bowl).
2. Deadlock: It may also happen that all philosophers are hungry, and, by chance, each philosopher has picked up the chopstick to the left of his bowl and is waiting for the chopstick to the right of his bowl to become available - which will never happen. This situation is very rare, but it does occur !

Both situations are critical points for simulators. On the one hand, the model descriptions (which are usually higher than event descriptions) are comfortable, yet their translation to the event level may differ considerably from simulator to simulator. In the cases investigated the user usually does not know a) how the simulator handles simultaneous tasks; how the event

scheduler (on which every discrete simulator is based) deals with simultaneous events (some event lists use FIFO techniques for the events, some for the entities); and b) whether a deadlock can really be detected immediately, or only some actions later, or whether the simulation will continue forever ?

In order to explore the simulators' features with respect to simultaneous access and deadlock detection, the following strategies and conditions must be observed:

i) Time for thinking and eating follows a discrete uniform distribution in the interval [1, 10] (the assumption of natural numbers guarantees the occurrence of simultaneous access and deadlock situations)

ii) All five philosophers start with a "thinking period".

iii) In a simultaneous access situation the philosopher sitting on the right gets the chopstick (to the left of his bowl) first and the philosopher to his left must wait (although he has already taken one chopstick and could start eating).

iv) When a deadlock occurs the simulation must terminate. (A deadlock is rarer than simultaneous access, so it is assumed that one or more simultaneous access situations will happen before a deadlock occurs.)

Any proposed solution should include, as an introduction, a brief summary of the simulator's features and the advantages of the modelling technique (object-oriented, modular etc.), followed by a model description of the Dining Philosophers' problem in the simulator's notation or syntax (textual and/or graphical). As a full description may be too long, a rough outline may do for some of the aspects whereas the elements (blocks, tasks, functions etc.) proposed to solve the conflict of simultaneous access and the elements required for detection of a deadlock should be defined in detail.

Two tasks are to be performed:

i. Single simulation run until a deadlock is reached

a) giving the average times (with standard deviation) of thinking, waiting and eating periods for each philosopher and all of them together, and rate of chopstick utilisation (individually and all together);

b) demonstrating the correct management of simultaneous access e.g. by documenting the status of the event queue when such a situation occurs (debugging of current events and entity movements at time instant of simultaneous access, including resolution of simultaneous access).

ii. Performing at least 50 simulation runs (ending in a deadlock !), indicating the maximum and minimum termination time. Indicate, how the deadlock is detected by the system and/or how the model has to be extended in order to terminate with a deadlock.

Please keep in mind that solutions must fit onto one page. A template solution is provided in this issue of SNE [13], another template solution may also be found on the ARGESIM WWW server (http://argesim. tuwien.ac.at/comparisons/). Further solutions that might serve as examples can be found in [14 - 16] (in German). We hope, that many simulationists (and philosophers) will accept the challenge of solving this comparison.

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Comparison 10 - GPSS/H

GPSS/H is a powerful, flexible and well established simulation language for discrete processes of any kind. It is a "grown" language, which has been developed for many years. It is to hope that the developers provide a Windows version or at least an environment. GPSS is based on a transaction-oriented view: transactions (some kind of entities) are moving along one-way paths through blocks, where they are handled. They are marked by attributes, which may be used for decisions etc.

Model description: The philosophers are represented by five transactions. For demonstrating modular modelling the actions of a single philosopher are described as a macro. Of importance for this model is the priority attribute (a standard attribute) for re-ordering events:

```
PHILO     STARTMACRO
          GENERATE            ,,,1
#A        ADVANCE             FIX(RVDUNI(1,1,10))
          SEIZE               #B
          PRIORITY            -1,YIELD
          SEIZE               #C
          PRIORITY            0
          ADVANCE             FIX(RVDUNI(1,1,10))
          RELEASE             #B
          RELEASE             #C
          TRANSFER            ,#A
          ENDMACRO
PHILO MACRO TABLE1,STICK1,STICK2
PHILO MACRO TABLE2,STICK2,STICK3
PHILO MACRO TABLE3,STICK3,STICK4
PHILO MACRO TABLE4,STICK4,STICK5
PHILO MACRO TABLE5,STICK5,STICK1
```

First the philosopher enters the system (GENERATE block). He sits at the table (at his place #A), and is thinking in the ADVANCE block for a certain time. Then he gets hungry and tries to pick up the chopstick #B to the left of his bowl in the SEIZE block. If he has got the chopstick, he tries to pick up the chopstick #C in the next SEIZE block. Now he can start eating (ADVANCE block with the eating time). After that he puts back both chopsticks (RELEASE #B, RELEASE #C) and starts meditating again at his place #A (TRANSFER #A). In order to fulfil the defined strategy the philosopher is given lower priority after he has got the left chopstick (PRIORITY,-1), which is set back (PRIORITY,0) after eating. Five macro calls define the model (actual parameters are the individual philosopher's position and left and right chopstick).

Results task i): The following table shows the results (deadlock at t=1427622):

	Thinking mean	Thinking stdev.	Waiting mean	Waiting stdev.	Eating mean	Eating stdev.
P1	5,5362	2,8753	11,3979	8,1011	5,5152	2,8698
P2	5,5106	2,8655	11,4876	8,1353	5,4428	2,8647
P3	5,5364	2,8773	11,3705	8,1102	5,5208	2,8795
P4	5,5236	2,8703	11,4002	8,0864	5,4980	2,8913
P5	5,5167	2,8834	11,4475	8,0886	5,4972	2,8808
All	5,5247	2,8743	11,4207	8,1043	5,4948	2,8773

Chopstick utilisation is individually: 91,8%, 91,9%, 91,7%, 91,9% and 91,9%, and overall 91,85% (rounded).

At time t=1407 indeed three philosophers (P1, P4, and P5) become hungry simultaneously. The "Current Event Chain" (CEC, no event queue !) consists of all transactions that want to move along their path through the blocks at the current simulation time. The transactions are arranged on this CEC in order of decreasing priority, in case of same priority in FIFO strategy. During the scan-phase of the event handler the first transaction of the CEC is **moved as far along its path as possible**, then the second, etc.
In the investigated case the CEC at t=1407 looks like (CEC traced in debugging mode):

XACT	CURBLK	NXTBLK	PRIORITY
4	70	71	0
1	4	5	0
5	92	93	0

Furthermore, at present P2 is eating (until t=1410) and P3 is thinking. P4 is now served first, he gets the "left" STICK3, and because he is allowed to move at the present time as far as possible along his path and his "right" STICK4 is available, he would get it, in conflict with the strategy, that claims STICK4 for P5. This conflict is resolved by PRIORITY -1,YIELD in between the two SEIZE blocks, giving P4 the lower priority -1 and forcing with YIELD a re-arrangement of the CEC:

XACT	CURBLK	NXTBLK	PRIORITY
1	4	5	0
5	92	93	0
4	76	77	-1

Now P1 is served, getting the "left" STICK1, again re-ordering, then P5 getting STICK5, re-ordering:

XACT	CURBLK	NXTBLK	PRIORITY
4	76	77	-1
1	10	11	-1
5	98	99	-1

The conflict is resolved, and at t=1410, when STICK2 and STICK3 become available, P1 starts to eat.

Results task ii): GPSS/H detects a deadlock and terminates the run with an error message

```
ERROR NUMBER 410 - No Transactions left in the
system, or none can move; ABSCLOCK: 4.1929E+05
```

In order to validate time and status of this termination, the model was extended by a "deadlock observer" where a global variable counts the number of left chopsticks picked up. If this variable equals 5 (TEST E &DEADLOCK,5) the run is terminated. This yielded the same results as the automatic detection by the system. Multiple simulation runs showed that time instants, where a deadlock occurs, are wide spread (100 runs on a PC 486-133 took about 188 min):

# runs	2	20	50	100	200
min. t	1427622	220718	220718	1895	1895
max. t	4121542	24062316	24062316	24062316	24062316

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Comparison 7 - ModelMaker

ModelMaker is a PC package which solves algebraic and first-order differential equations. Each equation appears on the screen as a rectangular box (square edged for differential, round edged for algebraic). Boxes are connected via lines known as "influences", which indicate where one component depends on values generated in another component. Too many lines make for an unclear picture, so variables can be declared as global, if desired, to reduce the need for influence lines. Events are represented by circles. They consist of a condition statement, which identifies the occurrence of the event, and an action statement, which specifies the action(s) to take. ModelMaker has facilities for minimisation and optimisation.

Model description: The pendulum 2nd order DE is replaced by two 1st order DEs and an algebraic equation for ModelMaker:

$$\dot{v} = - g \sin(\varphi) - vd / m$$

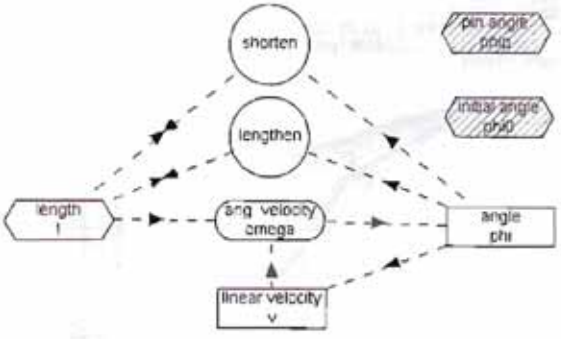
$$\dot{\varphi} = \omega$$

$$\omega = v / l$$

where v is linear velocity and ω is angular velocity. Events "shorten" and "lengthen" are used to change the effective pendulum length. In "shorten" we have:

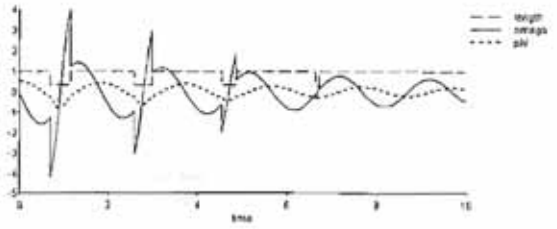
Condition: *phi* < *phip* and *l* = *long*
Action: *l* = *short*

where *long* and *short* are the constants 1 and 0.3 respectively. Event "lengthen" is defined similarly, with the obvious changes. The program appears as:



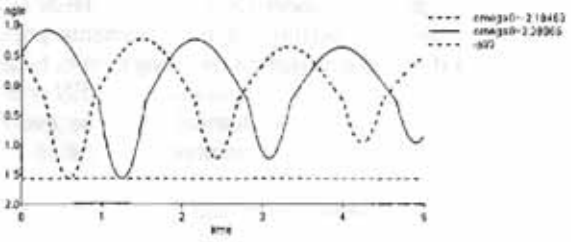
Task a: This is straightforward, and is solved using a 4th order Runge-Kutta adaptive time step integration algorithm (one of four different integration algorithms available in ModelMaker).

The results for task a(i) are:

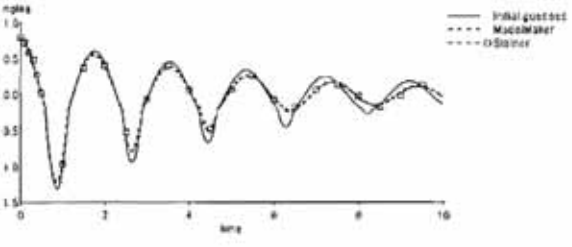


Task b: The linear and non-linear models are run sequentially using ModelMaker's repeat run facility together with its conditional equation capability (used in the linear velocity component). The resulting angles can be plotted together as part of the one run, but the differences have to be calculated separately using the file of results.

Task c: Although ModelMaker is capable of minimising functions, the time at which they are to be minimised must be pre-specified. Since the time is not known in advance for this problem, the approach adopted here is simply to run time backwards, using the known end conditions as initial conditions. This means the two 1st order DEs above must change sign. An additional event is added to capture the values of ω when phi=π/6. The resulting values of ω are found to be -2.18463 and 2.29066. These are validated by driving the original model in the forward direction, with the following results:



Task d: ModelMaker's optimisation routine can be used to solve task d, suggested by Steiner in issue 9. Using his data and initial values ModelMaker finds phi0=0.79149, omega0=-0.23711 and d=0.3958.



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Comparison 7 - ESL

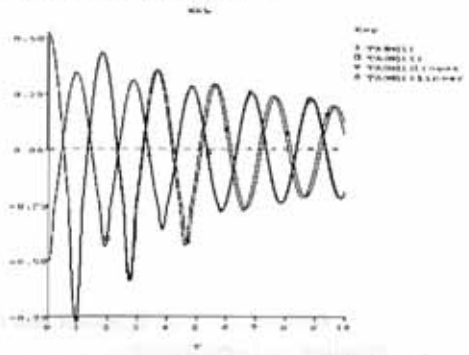
ESL is a continuous system simulation language of CSSL type. It provides conventional textual modelling and also graphical modelling. One of ESL highlights is an efficient and sophisticated state event handling. It is possible to run ESL models under the ESL interpreter (ESL Simulation Execution Control) or to produce FORTRAN or C++ Code for fast standalone realtime simulation, or for linking with other programs. The ESL Simulation Execution Control is a (graphical) user interface to control interactively a simulation run (changing parameters, preparing plots, etc.).

This comparison was performed on a SUN 4.3.30 with SUN OS as operating system, which only supports 16-bit floating point operations. ESL automatically uses the computer's highest accuracy available.

Model description: The following textual model description is in principle of classical CSSL type. But state events can be modelled very naturally within the state equations (Dynamic Section). There a WHEN - THEN construct allows to model state events of any type. Each time when the logical expression in WHEN changes its value (zero-crossing of threshold function) ESL starts an event finder and locates the event using an iterative state event finder (Note that a WHEN locates the event and performs the assignments after THEN only if the logical expression changes from false to true, while the assignments following a THEN controlled by a preceding IF statement are done every time.) In the model header parameters may be used:

```
STUDY
MODEL PENDULUM(:=REAL:phi0,dphi0,
               d,phip;LOGICAL:lin);
  REAL:phi,dphi,l;
  CONSTANT REAL:m/1.02/,ll/1.0/;
  CONSTANT ls/0.3/,g/9.81/;
INITIAL
  phi:=phi0; dphi:=dphi0;
DYNAMIC
  dphi':=IF lin THEN -g/l*phi-d/m*dphi
         ELSE - g/l*SIN(phi)-d/m*dphi;
  phi':=dphi;
  l:=IF phi >= phip THEN ll ELSE ls;
  WHEN phi >= phip THEN
       PRINT t; dphi:=dphi*ls/ll;
  END_WHEN;
  WHEN phi <= phip THEN
       PRINT t; dphi:=dphi*ll/ls;
  END_WHEN;
STEP
  PLOT t,phi,0,10,-0.8,0.8;
  PREPARE"cmp7",t,phi,phi';0
END PENDULUM;
EXPERIMENT
CONSTANT REAL:pi/3.141592654/;
  TSTART:=0.0; TFIN:=10.0;
  CINT:=0.1; ALGO:=RK5;
  DISERR:=1.0e-5; INTERR:=1.0e-6;
  PENDULUM(:=pi/6.,0.,0.2,-pi/12.,false);
  PENDULUM(:=-pi/6.,0.,0.1,-pi/12.,false);
  PENDULUM(:=pi/6.,0.,0.2,-pi/12.,true);
  PENDULUM(:=-pi/6.,0.,0.1,-pi/12.,true);
END_STUDY
```

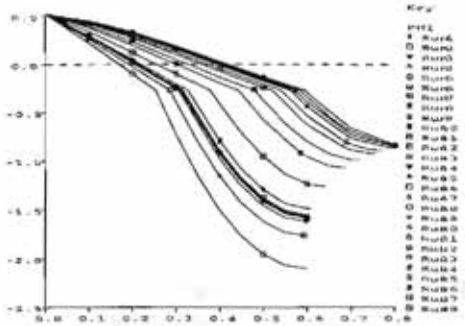
Tasks a) and b): The following figure shows the graphical results of the simulation runs for task a) i) and ii) for both the linear and the nonlinear case, resulting from the experiment descriptions defined after the model description (see before):



In task a) i) the pin was hit at t=0.70364, 2.5904, 4.5428, 6.6488 and left at t=1.1518, 2.9905, 4.8675, 6.7203. The difference between the linear and nonlinear model is very small and can hardly be seen in the graph. It is possible to plot data from sequential simulation runs but it is not possible to calculate the difference at runtime level.

Task c): ESL offers parameter optimisation by an OPTIMIZE command at execution control level. In the TERMINAL Section the goal function is calculated, the simulation run is terminated if dphi is zero. The numerical result is $d\varphi/dt\,(0)=-2.1847$, the following figure shows the course of iterations:

```
PENDULUM(REAL:phimin:=REAL:dphi0); ...
DYNAMIC .....
  WHEN dphi >= 0 THEN
          done:=true;
  END_WHEN; .....
STEP
  PLOT t,phi,0.1,-2,0;
  TERMINATE done;
TERMINAL
  phimin:=abs(phi+pi/2);
END PENDULUM;
EXPERIMENT .....
  CONSTANT REAL:pi/3.141592654/;
  OPTIMIZE PENDULUM(phimin:=dphi0);
END_STUDY
```



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Comparison of Parallel Simulation Techniques
ASCET-RS

In this series of comparisons a solution with ASCET-RS has been described (see SNE 17). Results are presented now for the coupled predator-prey population model that forms the second test example for the comparison of Parallel Simulation Techniques.

Description of ASCET-RS: ASCET-RS stands for **A**dvanced **S**imulation and **C**ontrol **E**ngineering **T**ool - **R**ealtime **S**imulator. It is an integrated design and rapid prototyping environment for modelling and simulating linear, nonlinear, continuous, discrete and mixed systems. Portability for on-site operation, and realtime capability for time-critical events help to optimize the entire development process.

ASCET-RS is an open system as it allows data input and output from and to other systems, system modifications and parameter variations during simulation and hardware-in-the-loop applications. Special features are parameter optimization under realtime conditions, state machine description and multi-processing.

ASCET-RS is a Transputer based parallel system. Simulations take place on the array of Transputers (T805) connected to a PC as a front end computer. For inter-processor communication the messages are sent via the Transputer-"Links" (serial, 20 Mbit/s transfer rate). Model equations can be distributed to different ASCET-RS blocks. The user can specify on which processor a block will be placed.

Model description: The ASCET-RS block editor is used to define inputs and outputs of individual blocks, as well as their equations. The functional description of a block is based on a high level language with special elements for simulation. The function can be a mixture of nonlinear differential and algebraic equations. All simulations have been done using single precision and Adams-Bashforth-algorithm for integration with step-size dT=0.001. Figure 2 shows the block description for the predator-prey populations w1 and w2.

The ASCET-RS code for the other populations is also very simple and is not included in this note due to space limitations. It is available to anyone interested on request.

The different blocks are connected in the ASCET-RS modelling window (figure 1). At each communication interval the data of the output values in one block are sent to the corresponding input signals of the other block.

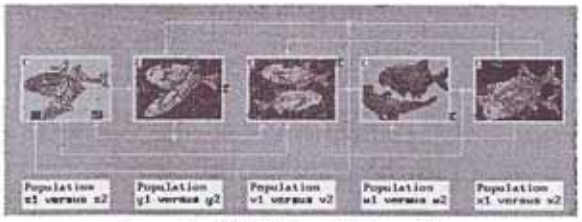

Figure 1: ASCET-RS modelling window

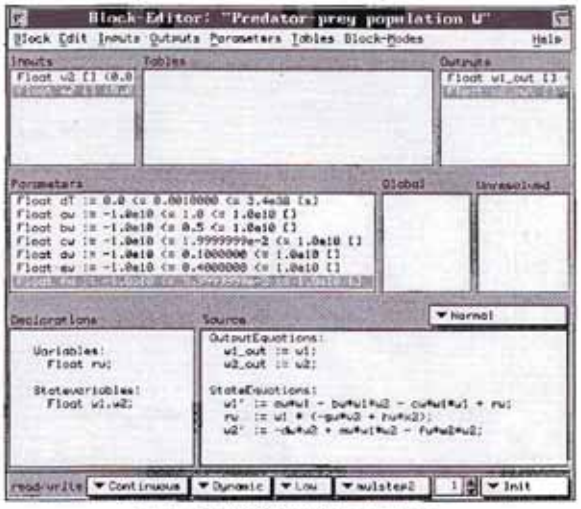

Figure 2: ASCET-RS block editor

Simulation and results: Blocks are compiled and linked to the run-time system. All simulations are done in background. During the calculation it is possible to view values of variables continuously, to stop or create blocks.

For the coupled predator-prey population model the five populations are distributed on up to five processors. In addition we will examine the influence of the communication overhead through the parallelization.

First, all five tasks were located on different processors, therefore the communication overhead was high. With communication performed at every integration step (c_{int}=dT=0.001) the parallelization resulted in a speed-up-factor of f=1.71, with reduced communication (c_{int}=4dT) f increased to f=3.53. Increasing the communication interval to c_{int}=10dT led to a factor of f=4.52.

In the ASCET-RS Transputer window the Transputer links can be connected. Figure 3 shows the used configuration of the links with 5 Transputers T1 ... T5.

Figure 3: ASCET-RS Transputer window

Enlarging the communication interval c_{int} means that the integration algorithm uses "old" input values for more than one step.

Therefore figure 4 shows the solutions for the populations w1(t) and w2(t) for c_{int}=dT and c_{int}=10dT. The deviation at t = 100 is less than 10E-2.

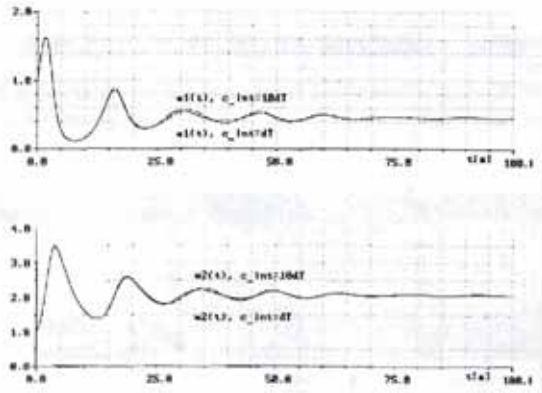

Figure 4: w1(t) and w2(t) for c_{int}=dT and c_{int}=10dT

We executed our test problem on various numbers of Transputers for various communication intervals. The results are depicted in figure 5.

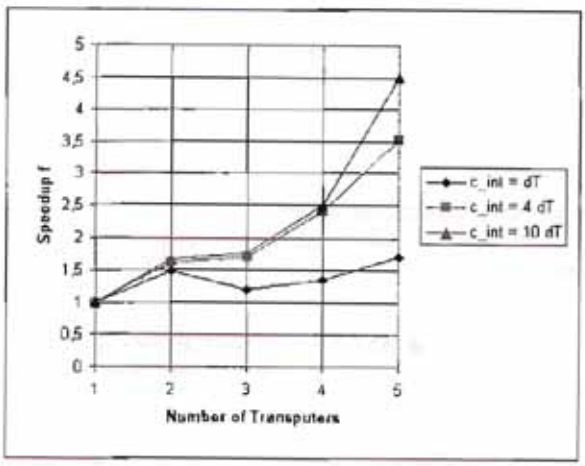

Figure 5: Speedup-factors

Being familiar with ASCET-RS, programming and testing the parallel solutions took about 2 days.

For further information about ASCET-RS and comments please contact: *Jörg Schäuffele, ETAS GmbH &Co.KG, Markgröninger Str. 45, D-71701 Schwieberdingen, Tel: +49-711 811-3653, Email: etepa_sf@siiks.a1.bosch.de*

Comparison of Parallel Simulation Techniques
mosis
Parsytec Supercluster / Parsytec Explorer

During a stay at the University of Glasgow there was the possibility to implement the simulation system mosis on two parallel computer systems installed there and to try the parallel comparison.

The parallel simulation system mosis was designed at the Technical University of Vienna. The results of two parallel implementations (Cogent XTM, RS6000 cluster under PVM) for this particular comparison have already been presented in SNE 11 and SNE 12.

mosis is a continuous simulation system especially designed for parallel computer architectures, but it can be used with single processor computers as well; the underlying parallelization concept is the *model interconnection concept* which allows a complex simulation model to be described as a connection of several smaller individual models that are executed autonomously as processes / threads and communication with each other on the network. A main advantage is that all issues concerning parallelism are hidden to the user: the simulation code (and even the experimentation commands) are exactly the same when the model is simulated on a multiprocessor network as when it is executed on a simple PC. The user also does not have to insert explicit communication commands into the simulation model; this is done automatically by the mosis translator.

mosis offers a powerful CSSL-type modelling language based on "C" and a "C"-like experimentation interpreter with programming features. Before models can be simulated, instances (corresponding to processes in the network) containing the actual data and connection information of those have to be created and eventually connected to other instances (for parallel models).

mosis is distributed as *freeware* and is available for a number of different computer systems (including PC/Windows).

At the University of Glasgow there are three parallel computer systems by the Parsytec, specialists for parallel computing; two of them were used for the implementation of mosis:

The "older" one is the Parsytec Supercluster consisting of 64 transputers T800, equipped with 4 MB RAM each.

The newer one (installed 1995) is a Parsytec Xplorer consisting of 4 PowerPC processors, 8 MB RAM each.

Both systems are connected to a SUN workstation for user interaction and run under the PARIX 1.x operating system (but different sub-versions that are unfortunately quite different for programming).

mosis was designed in a very modular way, so it should have been very easy to adapt it to any new computer architecture: three "C"-modules contain all operating system dependent code, one for graphics, one for user interaction (the same for all "raw" UNIX implementations) and one for process handling and message passing. Nevertheless there were some problems for the mosis implementations on the two machines: the first was that the PVM implementation on the Xplorer did not work correctly (the PVM implementation of mosis would have been easy, as it already existed), so the Parix system routines had to be used. The second problem was that the Parix implementations were quite different on the two systems so that many parts of the code had to be written twice.

Results of the Parallel comparison - General Issues

Although both computer systems were made by the same manufacturer, they showed an absolutely different behaviour for these comparisons: the Supercluster implementation works quite slow, but the relative speed-up factors are very good, while the Xplorer implementation works very fast in absolute terms, but the relative speed-up factors are much worse than with other systems (the relation between processor speed and communication speed is quite different, not only on the hardware level). For better comparability 4 processors were used in each system, in the Supercluster also 8 processors were used. All simulations were done with the demanded integration algorithms (all RK4) and system parameters.

Monte Carlo Study

With this problem, all systems had a relatively linear speed-up: the Xplorer version had $f = 3.1$; the Supercluster results were $f = 3.92$ (4 processors) and $f = 7.86$ (8 processors). The reason for the relative low speed-up factor for the Xplorer could be the relatively high communication overhead of mosis (polling for messages like simulation stop, view variables etc.)

Coupled Predator-Prey System

This part of the problem showed the differences between both systems in a dramatic way. The simulations were carried out with 5 processors (4 processors on the Xplorer) with communication either after each simulation step ($cint = dt$) or each 10th simulation step ($cint = 10.dt$):

	Xplorer 4 x PowerPC	Supercluster 5 x T800
cint = dt	f = 0.0032	*f* = 0.24
cint = 10.dt	f = 0.03	*f* = 0.72

In this table one can see that the parallelization of this problem on the Xplorer is extremely ineffective: The parallel version takes around 300 times longer than the serial one! On the contrary the parallelization on the Supercluster is not so bad: When communication is done only each 10th step, the parallel version is not much slower than the serial one (note: this problem is intended to yield negative results, i.e. speed-up factors less than one). The problem is of too fine grain for systems with high computation speed.

Partial Differential Equation

The results for this example confirm the numbers described above. Simulation was done on 4 (Xplorer) or 8 (Supercluster) processors with eight tasks (800 lines split into 8 processes = 100 lines or 200 differential equations, resp. for each process). Experimentations were done with communication every step and each 4th step.

	Xplorer 4 processors	Supercluster 8 processors
cint = dt	f = 0.6	*f* = 3.6
cint = 4. dt	f = 1.5	f = 7.2

While the Xplorer does not gain a reasonable speed-up factor - even with sparse communication, the Supercluster gets a quite good factor even with regular communication which is even improved with less communication (nearly linear speed-up).

Conclusion

Although both computer systems are produced by the same manufacturer, they have a totally different behaviour in terms of parallelization: The Xplorer consists of very fast processors with a (relatively) very slow (with respect to the processor's speed) communication system; on the other side the Supercluster consists of many slow processors, but has a - relative to that - efficient communication system.

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Classes on Simulation

November 1996

14-16 **ACSL Course.** TU Delft, The Netherlands
Contact: Rapid Data Ltd., Amelia House, Crescent Road, Worthing, West Sussex, BN11 1RL, UK, Tel: +44-1903 821266, Fax: +44-1903 820762, Email: info@radata.demon.co.uk

20-22 **COMNET III Course.** Paris, France.
Contact: CACI Products Division, Suite 11, Coliseum Business Centre, Riverside Way, Camberley, Surrey GU15 3YL, UK, Tel:+ 44 1276 671 671, Fax:+ 44 1276 670 677

26 *ACSL, Parallele Simulation und Simulatorkopplung.*
Seminar at TU Vienna, Austria
Contact: Prof. Dr. Felix Breitenecker, ARGESIM, TU Wien, Abt. Simulationstechnik, Wiedner Hauptstraße 8-10, A-1040 Wien, Tel: +43-1 58801 5374, Fax: +43-1 5874211, Email: argesim@argesim.tuwien.ac.at

28 *Effektive Simulation von Schaltnetzteilen.*
Munich, Germany.
Contact: BAUSCH-GALL GmbH, Wohlfartstr. 21b, D-80939 München, Tel: +49-89 3232625, Fax: +49-89 3231063, Email: 100564.302@compuserve.com

29 *Effektive Regelung von Schaltnetzteilen.*
Munich, Germany.
Contact: BAUSCH-GALL GmbH

December 1996

3-4 *Simulation mit SIMULINK.* Munich, Germany.
Contact: BAUSCH-GALL GmbH

4-6 **MODIM Course.** Frankfurt, Germany.
Contact: CACI Products Division

5 *Objektorientierte Modellierung mit DYMOLA.*
Munich, Germany.
Contact: BAUSCH-GALL GmbH

9-11 **COMNET III Course.** Frankfurt, Germany.
Contact: CACI Products Division

16-18 **COMNET III Course.** Camberley, U.K.
Contact: CACI Products Division

19 *Diskrete Simulation, Verkehrssimulation, Simulation mit SIMPLE++.*
Seminar at TU Vienna, Austria
Contact: Prof. Dr. Felix Breitenecker

February 1997

25-26 *MATLAB-Kurs.* Munich, Germany.
Contact: BAUSCH-GALL GmbH

March 1997

11-12 *Simulation mit SIMULINK.* Munich, Germany.
Contact: BAUSCH-GALL GmbH

13 *Objektorientierte Modellierung mit DYMOLA.*
Munich, Germany.
Contact: BAUSCH-GALL GmbH

MATLAB. Seminar at TU Vienna, Austria
Contact: Prof. Dr. Felix Breitenecker

April 1997

2-4 *CCG Kurs. Simulation kontinuierlicher Systeme.*
Oberpfaffenhofen, Germany.
Contact: Carl-Crantz-Gesellschaft e.V., Postfach 1112, D-82235 Oberpfaffenhofen, Tel: +49-8153 282413, Fax: +49-8153 281345 or Prof. F. Breitenecker, TU Wien, Abt. Simulationstechnik, Wiedner Hauptstr. 8-10, A-1040 Wien, Tel: +43-1 58801 5374, Fax: +43-1 5974211, Email: Felix.Breitenecker@tuwien.ac.at

22-23 **ACSL, Graphics Modeller, ACSL/MATH.**
Munich, Germany.
Contact: BAUSCH-GALL GmbH

25-27 **ACSL Course.** RDL Worthing, U.K.
Contact: Rapid Data Ltd., Amelia House, Crescent Road, Worthing, West Sussex, BN11 1RL, UK, Tel: +44-1903 821266, Fax: +44-1903 820762, Email: info@radata.demon.co.uk

Calendar of Events

December 1996

8-11 **WSC 96.** 1996 Winter Simulation Conference. Coronado, CA, USA
Contact: J.J. Swain, University of Alabama, Dept. Industrial and Systems Engineering, Huntsville, AL 35899, Tel.: +1-205 895 6749, Fax: +1-205 895 6733, Email: jswain@ebs330.eb.uah.edu, WWW: http://www.cc.ukans.edu/wsc96

12-13 **ISCS'96.** Annual Conference of ISCS. Roma, Italy
Contact: Segreteria ISCS'96, Università di Roma "Tor Vergata", Dipto. di Ingegneria Civile, Via della Ricerca Scientifica, I-00133 Roma

19-21 **EUROMEDIA 96.** . London, U.K.
Contact: Philippe Geril, SCS European Simulation Office, University of Ghent, Coupure Links 653, B-9000 Ghent, Tel.: +32-9 233 77 90, Fax: +32-9 223 49 41, Email: Philippe.Geril@rug.ac.be, WWW: http://hobbes.rug.ac.be/~scs

January 1997

15 **ASIM Workshop.** *"Simulation in Produktion und Logistik".*
Kassel, Germany
Contact: Dipl.-Inform. S. Wenzel, Fraunhofer IML, Joseph-von-Fraunhofer-Str. 2-4, D-44227 Dortmund, Tel.: +49-231-9743 237, Fax: +49-231-9743 234, Email: wenzel@iml.fhg.de

February 1997

5-7 **2nd MATHMOD.** IMACS Symposium on Mathematical Modelling. Vienna, Austria
Contact: Prof. Dr. Inge Troch, Technische Universität Wien, Abt. Simulationstechnik, , Wiedner Hauptstr. 8-10, A-1040 Wien, Tel.: +43-1-58801-5367, Email: inge.troch@tuwien.ac.at

March 1997

6. Symposium Simulation als betriebliche Entscheidungshilfe. Braunlage, Germany

Contact: Prof. Dr. W. Hummeltenberg, Universität Hamburg, Institut für Wirtschaftsinformatik, Max-Brauer-Allee 60, D-22765 Hamburg, Tel.: +49-40 41234023, Fax: +49-40 41236441

3-4 **ASIM Workshop.** *Simulation Technischer Systeme und Simulationsmethoden und -sprachen für verteilte Systeme und parallele Prozesse.* Rostock, Germany
Contact: Dr. Ingrid Bausch-Gall, BAUSCH-GALL GmbH, Wohlfartstraße 21b, D-80939 München, Tel.: +49-89 3232625, Fax: +49-89 3231063, Email: 100564.302@compuserve.com

6-7 **sa'97.** Simulation und Animation. Magdeburg
Contact: Simulation und Animation 97, FIN, ISG, Otto-von-Guericke Universität Magdeburg, Postfach 4120, D-39016 Magdeburg, Tel.: +49-391 67 11332, Fax: +49-391 76 11164, Email: tagung@isg.cs.uni-magdeburg.de, WWW:http://simsrv.cs.uni-magdeburg.de/, WWW: http://simsrv.cs.uni-magdeburg.de/~deussen/tagung97.htm

April 1997

17-19 **7. Ebernburger Gespräch.** Joint Meeting of three ASIM Working Groups. Ebernburg, Germany
Contact: Prof.Dr. D.P.F. Möller, TU Clausthal, Institut für Informatik, Erzstraße 1, D-38678 Clausthal-Zellerfeld, Tel.: +49-5323 72 2504, Fax: +49-5323 72 3572, Email: moeller@informatik.tu-clausthal.de

23-25 **UKSIM'97.** United Kingdom Simulation Society Conference. Keswick, U.K.
Contact: Prof. Graham Birtwhistle, Div. of OR and Inform. Syst., Sch. of Comp.Stud., The University, GB-LS2 9JT Leeds, Tel.: +44-113-243-1751, Email: graham@scs.leeds.ac.uk

28-30 **MOSYS'97.** Modelling and Simulation of Systems. Hradec, Czech Republic
Contact: Jan Stefan, FEI -VSB TU, tr. 17. listopadu, CZ-708 33 Ostrava Poruba, Email: Jan Stefan@vsb.cz

June 1997

5-6 **ASIM Workshop.** "Simulation von Verkehrssystemen". Ratingen, Germany
Contact: Karl Heinz Münch, SIEMENS AG, Bereich VT2 SYS, Ackerstraße 22, D-38126 Braunschweig, Tel.: +49 531 226 2225, Fax: +49 531 226 4305

9-11 **5th European Cars/Trucks Workshop Symposium.** Germany
Contact: Moshe Heller, ASIMUTH GmbH, Planegger Straße 26, D-81241 München, Tel.: +49-89-8345073, Fax: +49-89-8347575

10-13 **11th Workshop on Parallel and Distributed Simulation.** Lockenhaus, Austria
Contact: Alois Ferscha, Universität Wien, Inst. f. Angewandte Informatik, Lenaugasse 2/8, A-1080 Wien, Tel.: +43 1 408636618, Fax: +43 1 4080450

17-20 **ITI'97.** 19th International Conference Information Technology Interfaces. Pula, Croatia
Contact: University Computing Centre, J. Marohnica bb, HR-41000 Zagreb, Tel.: +358-1-518-656, Fax: +358-1-518-656, Email: iti@srce.hr, WWW: http://www.srce.hr/iti/

July 1997

27-August 1
AMS'97. IASTED International Conference on Applied Modelling and Simulation. Banff, Canada
Contact: IASTED Secretariat, 4500-16 Ave. N.W., Unit 80, Calgary, Alberta, T3B 0M6, Tel.: +1-403 288 1195, Fax: +1-403 247 6851, Email: iasted@istd.cuug.ab.ca, WWW: http://www.cuug.ab.ca:8001/~warwodad/iasted.html

August 1997

11-14 **MSO'97.** IASTED International Conference on Modelling, Simulation and Optimization. Singapore
Contact: IASTED Secretariat, 4500-16 Ave. N.W., Unit 80, Calgary, Alberta, T3B 0M6, Tel.: +1-403 288 1195, Fax: +1-403 247 6851, Email: iasted@istd.cuug.ab.ca, WWW: http://www.cuug.ab.ca:8001/~warwodad/iasted.html

24-29 **15th IMACS World Congress.** Berlin, Germany
Contact: Prof.Dr. A. Sydow, GMD FIRST, Rudower Chaussee 5, D-12489 Berlin, Tel.: +49-30 67045610, Email: sydow@prosun.first.gmd.de

September 1997

1-4 **WCSS97.** 1st World Congress on System Simulation. Singapore
Contact: Secretariat of the 1st World Congress on System Simulation, c/o IEEE Singapore Section, 59D Science Park Drive, The Fleming, SGP-118243 Singapore, Tel.: +65 773 1141, Fax: +65 773 1142, Email: ieeesgp@pacific.net.sg, WWW: http://www4.informatik.uni-erlangen.de/~rimane/wcss97.html

16-18 **Advanced Simulation of Systems.** Krnov, Czech Republic
Contact: Jan Stefan, FEI -VSB TU, tr. 17. listopadu, CZ-708 33 Ostrava Poruba, Email: Jan Stefan@vsb.cz

October 1997

08-09 **Modelling and Simulation in Management and Control.** Zilina, Slovak Republic
Contact: Dr. Mikulas Alexik, University of Zilina, Dept. Technical Cybernetics, Velky Diel, SK-010 26 Zilina, Slovak Republic, Tel.: +42 - 89 - 54042, Fax: +42 - 89 - 54806, Email: alexik@frtk.utc.sk

November 1997

11-14 **ASIM 97.** *11. Symposium Simulationstechnik.* Dortmund
Contact: Dipl.-Inform. S. Wenzel, Fraunhofer IML, Joseph-von-Fraunhofer-Str. 2-4, D-44227 Dortmund, Tel.: +49-231-9743 237, Fax: +49-231-9743 234, Email: wenzel@iml.fhg.de

April 1998

14-18 **EUROSIM '98.** EUROSIM '98 European Simulation Congress. Helsinki, Finland
Contact: EUROSIM'98, P.O.Box 1301, FIN-02044 VTT, Fax: +358-9-456 6754, Tel: +358-9-456 6422, Email: eurosim98@vtt.fi

EUROSIM - Simulation News Europe

Scope: Information on simulation activities, membership information for European simulation societies, comparisons on simulation techniques

Editors: *F. Breitenecker, I. Husinsky*
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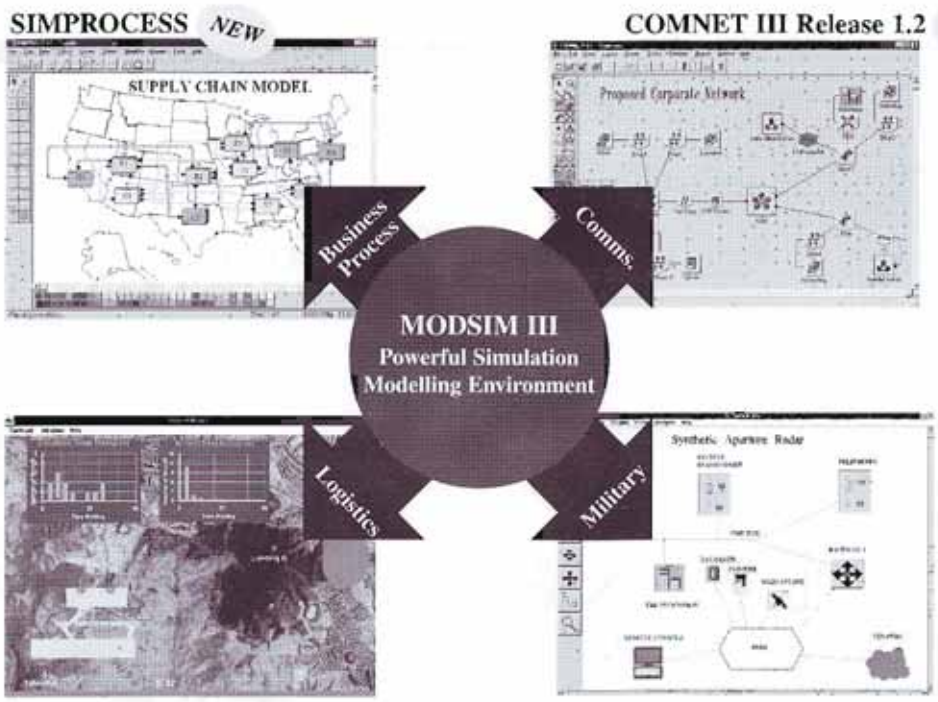

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3 GUTE GRÜNDE FÜR EIN AUSGEZEICHNETES MATHEMATISCH/TECHNISCHES PROGRAMMPAKET

1 MATLAB

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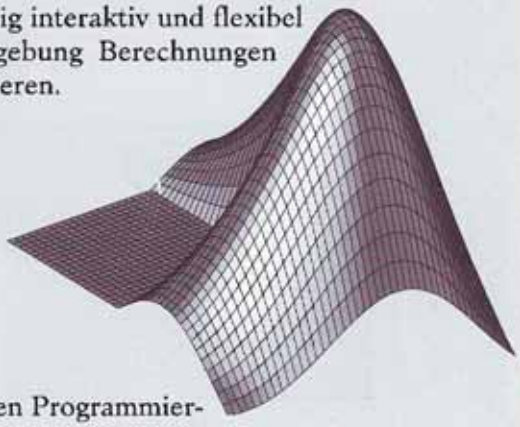
Mit wenig Aufwand und wenigen Befehlen vollständig interaktiv und flexibel in einer einheitlichen intuitiven und offenen Umgebung Berechnungen durchführen, die Ergebnisse auswerten und visualisieren.



2 SIMULINK

DAS TOR ZUR SIMULATION

In einer offenen und leicht zu verstehenden grafischen Programmiersprache blockorientiert und interaktiv nichtlineare Modelle hierarchisch erstellen, simulieren, analysieren und die Ergebnisse weiterverarbeiten.

3 TOOLBOXEN

DIE PASSENDEN BAUSTEINE FÜR AN- UND AUSBAU

Mit umfassenden und offenen Bibliotheken von MATLAB-Funktionen aus den verschiedensten Anwendungsbereichen arbeiten und diese zielorientiert einsetzen.

REGELUNGSTECHNIK, SIGNALVERARBEITUNG, SYMBOLISCHE MATHEMATIK, STATISTIK, NEURONALE NETZE, SYSTEMIDENTIFIKATION, FUZZY LOGIC, OPTIMIERUNG, REAL TIME, FINANZTECHNIK, C-CODE GENERIERUNG

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