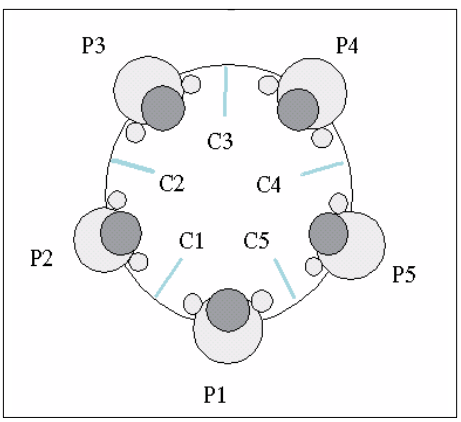
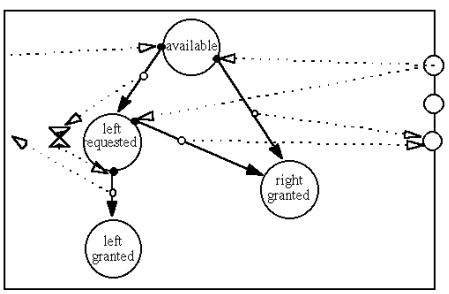
SIMULATION NEWS EUROPE

EUROSIM





	Thinking		Waiting		Eating	
	mean	stdev.	mean	sdev.	mean	stdev.
P1	5.51	2.93	11.58	8.05	5.51	2.93
P2	5.65	2.82	11.63	8.20	5.56	2.86
P3	5.42	2.87	11.60	7.98	5.60	2.87
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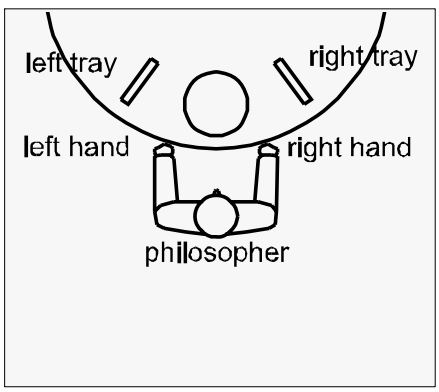

Number 19 March 1997

A EUROPEAN FORUM ON SIMULATION ACTIVITIES

Contents

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Deadline for the next issue will be June 2, 1997.

Editorial

Since 1990 we are acting as editors of this journal, ***EUROSIM - Simulation News Europe*** *(SNE). In order to comply with recent developments and to meet the requirements of the EUROSIM societies some changes in the production and appearance of this journal have been made after intensive discussions in the last months. These are the news:*

i) ***General:*** *SNE is going new ways of publishing, where printed information (archive value) and WWW information (short-term information) are equally balanced: A printed version – to be read e.g. in the metro – and structured on-line information on the WWW server – for on-line information retrieval and print on demand.*

ii) ***Production:*** *The non-profit working group ARGESIM provided and provides the infra-structure for all editorial tasks. From 1997 on ARGESIM is also producer and distributor of the journal (printing, bulk mailing to societies, information at conferences).*

iii) ***Distribution:*** *SNE is distributed by most EUROSIM member societies to their individual members as part of the membership services. Now individual subscriptions are also available (see page 58).*

On this occasion we would like to thank Elsevier Science B.V. for the good co-operation in the last years, and especially Mr. J. Kok who advised us to follow new unconventional publication strategies.

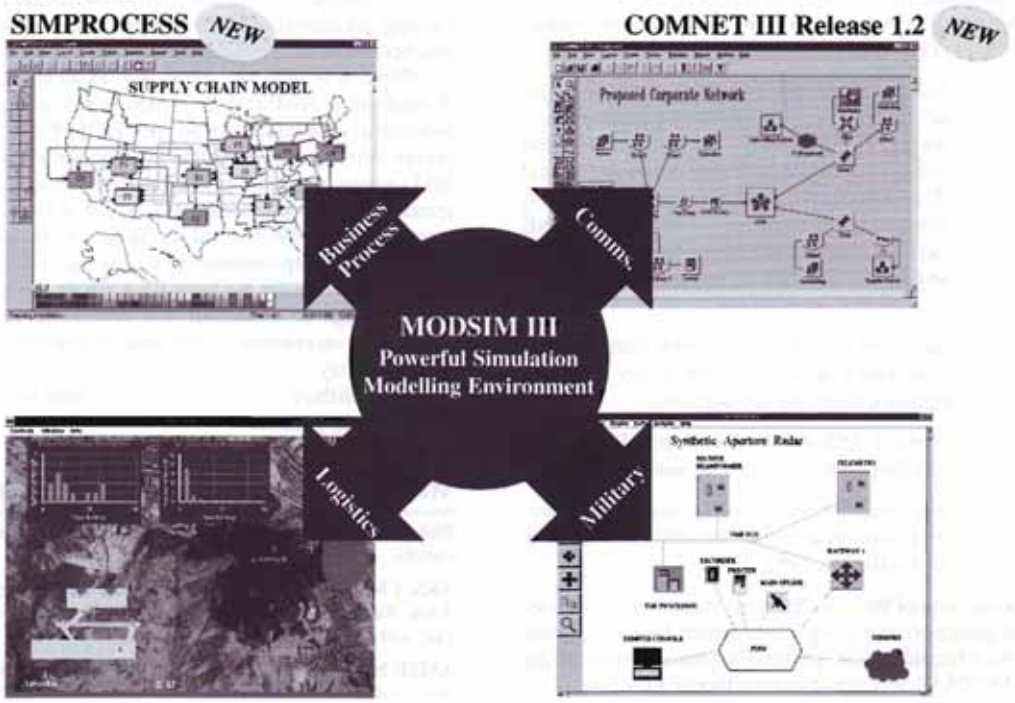
We are happy to publish in this issue a comprehensive essay on process modelling. You can find information on the coming EUROSIM'98 Congress and the usual news from the EUROSIM societies. From other societies and groups we have included several conference reports. We continue to present different simulation centers as well as new software developments in the field of simulation from different countries. An excerpt of the press releases that we receive regularly forms the industry news. Three pages have been dedicated entirely to reviews of several of the books that are in the queue to be reviewed.

The EUROSIM comparisons allow to compare special features of simulation software. In the last issue the "Dining Philosophers Problem" has been redefined. We are happy that quite a few people took the challenge and solved this comparison (see also title page).

This issue will have a wider distribution, it will also be distributed within User Groups. We would like to thank all who contributed to this issue and hope that our readers appreciate the changes we have made. Please let us know your opinion.

F. Breitenecker, I. Husinsky

Use MODSIM III Object-Oriented Simulation Environment to Jumpstart Your Project



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Readership Information

The journal *EUROSIM - Simulation News Europe* (abbreviated SNE) is published on behalf of EUROSIM (Federation of European Simulation Societies) three times a year (March, July, November) by ARGESIM (ARGE Simulation News), a non-profit working group. Circulation is 3000.

SNE is distributed by most EUROSIM member societies to their individual members as part of the membership services. At Congresses, Conferences, within Societies and Groups working in the area of Modeling and Simulation and within Software User Groups the journal spreads information on news and developments on modeling and simulation. SNE is also included as addendum in the scientific journal *Simulation Practice and Theory* (SIMPRA), published by Elsevier Science B.V.

New: SNE can be ordered by subcription from ARGESIM, based on a one year's subscription, on an any-time start basis (for subscription conditions see page 58).

In addition, parts of SNE can be found on ARGESIM´s WWW-Server http://argesim.tuwien. ac.at/sne/.

If you have any contributions, remarks, suggestions, etc. please contact the editors per mail, fax, or email. Deadline for the next issue will be **June 2, 1997**.

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.

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 most EUROSIM member societies, to other simulation societies, Simulation Working Groups and User Groups and to individuals (by means of individual subscriptions).

SNE's aims are: to inform about new developments in simulation methodologies, applications and software and hardware for modeling and simulation, to report news from European simulation societies and European simulation events (emphasizing SNE's role as *newsletter* of EUROSIM and of the European simulation societies) and from international simulation societies and working groups all over the world.

SNE contains news on EUROSIM, on the EUROSIM societies, on other international simulation societies and groups (and societies from related areas), on software user groups, on simulation centers, and contains a comprehensive calendar of events (congresses, conferences and workshops on modeling and simulation and related areas) and of classes on modeling and simulation.

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

The section on industry news contains the latest news available through press releases and announcements.

A special series on simulation comparisons (EUROSIM comparisons) gives a comprehensive overview on features and developments of simulation software and hardware, including parallelization techniques. These comparisons are also becoming standard benchmarks for simulation programs.

SNE is a printed journal as well as an electronic journal. A database (ARGESIM database) works as input server for structured information on the ARGESIM/EUROSIM WWW server. The database contains information about the EUROSIM comparisons (definition, solutions and evaluations),conferences, classes and books. A calendar of events and courses is available via WWW. EUROSIM/ARGESIM's WWW server can be found at http://eurosim.tuwien. ac.at/). SNE's calendar of events collects information about conferences, workshops and meetings on modeling and simulation and on related areas. Data on relevent events may be entered on the WWW server directly.

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

Members of the Editorial Board of SNE

Please contact them if you have contributions concerning a particular society.

EUROSIM

General Information

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),
- UKSIM - United Kingdom Simulation Society (U.K.).

- 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 (past president) and the organizer of the coming EUROSIM Congress (president). The Board elects officers, who are at present:

- K. Juslin (SIMS) - president,
- F. Breitenecker (ASIM) - past president,
- R. Zobel (UKSIM) - 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.

EUROSIM's daily affairs are handled by the **Executive Board**, consisting of the president, the past president, the president elect, the treasurer, the secretary, a SNE representative, a SIMPRA representative and a Board secretary. Furthermore, the Executive Board prepares topics and affairs to be discussed and decided at the regular EUROSIM Board meetings.

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.

EUROSIM News

At the occasion of the 2nd MATHMOD conference in Vienna (February 1997) a meeting of the EUROSIM Executive Board took place. Some changes of the internal rules concerning full membership and observer membership were discussed, furthermore co-operation agreements with international societies were prepared.

Other topics were the growth of EUROSIM and EUROSIM conferences. The status of a member society may be seen as NMO (National Member Organisation, as within IFAC or other federations), and so on the one side there is limited growth, on the other side the societies in some European reform countries do not show stable development. Furthermore, there are a lot of working groups, chapters of societies, and interest groups dealing with modelling and simulation. For both groups some intensive kind of co-operation as "affiliated group" was discussed.

Another way of spreading EUROSIM's ideas is co-operation with User Groups and supporting "Tech-

nical Committees". The Congress EUROSIM'98 will incorporate User Group Meetings. The first EUROSIM Technical Committee (TC1) was established at the meeting, aiming at the specification of a EUROSIM standard concerning a Unified Object-Oriented Language for Physical Systems Modeling. The language is called *Modelica*. In this way EUROSIM wants to promote co-operation between simulation language developers and the elaboration of a new obviously needed common standard suitable for modern software concepts. There will be a WWW link to information on the process of Modelica from the EUROSIM homepage. Hilding Elmqvist was nominated chairman for the committee.

EUROSIM also supports the idea of "International Simulation Conferences" under the umbrella of EUROSIM, which guarantees support, advertising and publishing. Member societies or affiliated groups are encouraged to organise such events. The Executive Board formulated rules and conditions for such events. Decisions about these proposals will be taken at the (general) EUROSIM Board Meeting in Keswick, UK (April 1997).

In the last months some problems arose with the printing of SNE at Elsevier Science B.V., so that at the end of the last year the societies asked for changes. In a discussion with Mr. Kok from Elsevier Science B.V. (partly present at the meeting in Vienna) it turned out that also Elsevier was unhappy with the situation and was in favour of a change. After discussions about formal topics the Board accepted an offer of ARGESIM for not only editing and publishing, but also printing SNE. The main points of the contract are a reasonably low price with bulk mail to the societies, an extended WWW support and WWW publication of SNE, partly more pages, sample copies for the societies and sample copies for advertising at conferences, and SNE as addendum to SIMPRA as before. SIMS decided to abolish their membership fee and wanted to have individual subscriptions to SNE. ARGESIM could also offer this individual subscription on a yearly base, with charging via credit card – the subscription is open to anyone interested in SNE.

Other topics of the meeting were the preparation of the EUROSIM Congress 1998 in Finland (see the Call in this issue), financial affairs and a general discussion on the development of publishing. With respect to the last topic an interesting discussion with Mr. Kok from Elsevier showed also some unconvential trends (via WWW) – SNE will do here the first steps. The meeting closed with an expression of thanks to Mr. Kok for his co-operation.

F. Breitenecker

E U R O S I M'9 8

Federation of EUROpean SIMulation Societies

3rd Triennial International Congress

April 14-18, 1998
Helsinki University of Technology, Finland

The Congress invites proposals from the introductory through advanced level on all topics related to Modelling and Simulation. There will be arranged for presentations of thoroughly reviewed full papers, short papers, and just in time posters. Posters may also be provided as an addition to a paper presentation. Publishers and software vendors are invited to demonstrate their products at the exhibition area. The time schedule will include vendor product presentations. Courses and user group meetings will be supported.

Special Topics:

Commercial Simulation Tools: Vendor Presentations and User Applications
Computational Fluid Dynamics, High Performance Computing, Distributed Simulation
New Developments and Research in the Field of Simulation
Use of Simulation for Training, Education and Entertainment

EUROSIM'98 is the third triennial congress of the Federation of European Simulation Societies. One of the purposes of this congress is to bring together simulationists from different organisations, interest groups in simulation and regional simulation societies, as well, each third year to promote the advancement of modelling and simulation in industry, research, education, and development. You are cordially invited to participate in this international forum.

The EUROSIM'98 Conference is with preference combined with Post Congress Events such as: simulation courses, user group meetings, technical tours, and visits. Options to visit St. Petersburg, Tallin or Stockholm will be provided for. For both cross country and down hill skiing enthusiasts a tour will be arranged to the northernmost parts of Finland, where there is still a lot of snow available.

EUROSIM'98 deadlines

One page Abstracts Submission	**November 15, 1997**
Strongly advised Early Registration to hotels and post congress trips and events	December 15, 1997
Full Paper Proposal Submission	**January 15, 1998**
Short Paper Proposal Submission	February 16, 1998
Main Congress Late Registration Deadline and Poster Submission	March 16, 1998
Main Congress	April 14-15, 1998
Post Events	April 16-18, 1998

One page Abstracts shall arrive preferably by E-mail at least one month before deadline of relevant paper submission. Abstract acceptance will be notified by E-mail within two weeks. The paper proposals shall be sent as complete WORD documents including pictures and figures in accordance with typing instructions. Full paper is 6 or alternatively 8 full pages, Short paper is 4 full pages and Poster is 1 full page. Paper proposals should arrive at latest 24:00 on the deadline day as E-mail attachments or as in time mailed diskettes. Paper Acceptance Notification will be made by E-mail in three weeks after the relevant deadline.

Please send all correspondence to the Local Organisers with Email

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Join our mailing list **now** to ensure that you get all needed information in time. Accepted full papers, short papers and posters will be published in separate congress proceedings. Vendors are responsible for the distribution of their own material during the vendor sessions or at the exhibition.

The EUROSIM'98 Simulation Congress is organized by SIMS - Scandinavian Simulation Society in cooperation with the other EUROSIM member societies: AES - Asociación Española de Simulación, ASIM - Arbeitsgemeinschaft Simulation, CROSSIM - Croatian Society for Simulation Modelling, CSSS - Czech & Slovak Simulation Society, DBSS - Dutch Benelux Simulation Society, FRANCOSIM - Société Francophone de Simulation, HSS - Hungarian Simulation Society, ISCS - Italian Society for Computer Simulation, SLOSIM - Slovene Society for Simulation and Modelling, UKSIM - United Kingdom Simulation Society.
Sponsoring Societies: CASS - Chinese Association for System Simulation, JSST - Japanese Society for Simulation Technology, LSS - Latvian Simulation Society, PSCS - Polish Society for Computer Simulation, ROMSIM - Romanian Society for Modelling and Simulation, SCS - Society for Computer Simulation.

General congress chair: Kaj Juslin, President of EUROSIM, Email: Kaj.Juslin@vtt.fi

Process-centered Modeling and Simulation Environments: Reducing the Cost of Developing Models and Performing Simulation Experiments

R. Bogusch, B. Lohmann, W. Marquardt
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WWW: http://www.lfpt.rwth-aachen.de/

Shortcomings of current modeling technology

Mathematical models are currently employed for almost all engineering activities during the entire plant life cycle, from designing the plant and its control system to training the operating personnel and detecting faults in its operation. Due to growing market pressure and demands on product quality the need for *detailed mathematical models* is expected to increase in the future. But rigorous modeling of physical systems is time-consuming and error-prone, modeling has become the major bottleneck in the widespread use of model-based techniques. Therefore, computer assistance to support the development of adequate mathematical models is indispensable to minimize the cost of developing models.

Current state-of-the-art modeling and simulation environments rely on concepts from general systems theory and object-oriented information modeling in order to facilitate model construction and reuse of already existing models. Object-oriented modeling languages such as Omola (Nilsson, 1993; Andersson, 1995) and Dymola (Elmqvist, 1993) allow e.g. to hierarchically decompose models into submodels in order to manage the complexity of models and to collect modeling objects into libraries for later reuse.

Although, object-oriented modeling techniques aim at reducing the modeling effort, current modeling technology provide no means

- to adopt, store and retrieve *modeling know-how* to be used to *guide the process of model development,*
- to gather *experience* over time by capturing successful modeling strategies,
- to systematically record all *assumptions and decisions* in order to render the modeling process transparent even after a longer period of time, and
- to *advise* the modeler depending on the modeling context by providing adequate background knowledge.

Therefore, future modeling environments should not only focus on the model itself, but also on the *process of model development* (cf. Jarke and Marquardt, 1996) in order to further reduce the cost of model development. Two aspects – guidance and documentation of the process of model development – will be discussed in the following.

Guidance directly supports the model development

The basic idea of process-centered model development is that the knowledge of setting up a new mathematical model for a given physical system not only lies in the resulting model itself, but also in the way *how* this model is built. Consequently, *guiding* modeling engineers by situated activation of modeling procedures, which e.g. provide expert information on actions to be performed next, leads to an increased quality of models in terms of correctness, consistency, robustness or appropriate degree of detail.

In the case of large differential-algebraic equation (DAE) systems, which e.g. are employed for rigorous modeling of distillation columns, typically most of the time is spent for model debugging and initialization. With guidance mechanisms at hand one might have less trouble, since initialization strategies provide means e.g. for initializing appropriate subsets of model variables using the results of earlier simulations. Hence, these guidance mechanisms actively support evolutionary model development as simpler versions of a model may be used to initialize a more complex one.

Guidance should be based on an information model that explicitly describes the process of model development (modeling process) in order to allow for its adaptation and continuous improvement of modeling

processes. Concepts from general systems theory as well as object-oriented techniques can be applied for the representation of modeling processes in the same way as for models themselves.

A modeling process may be decomposed into modeling steps on an arbitrary number of hierarchical levels. Each modeling step has preconditions describing necessary conditions for its application in a certain context. For example, the preconditions of a modeling step for analyzing the index of a DAE system would check whether there are any degrees of freedom left. The aggregation of modeling steps involves ordering steps on a time scale. This leads to a schedule describing how to proceed during model development. Moreover, this schedule may also offer a choice of different steps depending on the modeling context. But most important, guidance must not enforce the modeler, but allow him/her to customize modeling strategies in order to evolve modeling know-how over time.

Documentation enables the traceability of the model development

In order to facilitate model reuse and adaptation, the *history of model development* should be captured. This involves explicit recording of the initial problem description, the requirements that must be fulfilled by the model (i.e. the *scope* of the model) as well as all *deliberations and decisions* that influenced model development. For example, if a decision has to be taken whether a model assumption is valid or not, all supporting and objecting arguments should be documented in order to enable the traceability of model development.

The IBIS methodology (Conklin and Begemann, 1988) provides facilities to *document the modeling rationale* by focussing on the key issues of the modeling problem. Each *issue* is associated with one or more positions. A *position* is a statement which resolves an issue. Often positions are contradictory to each other. Each of an issue's positions, in turn, may have one or more *arguments* which either support or object to it. In order to maximize the productivity of modelers, documentation and tracing of the process of model development has to be supported by appropriate tools.

Hypertext editors can be used to create and maintain model documentation comprising natural language statements and graphics. The basic idea of the hypertext approach, which is also well-known from the World Wide Web, is to break documents into small pieces called *hypertext nodes* and to interrelate them with *hypertext links.* Each node may contain an arbitrary piece of information whereas labeled links are used to build the semantic structure of a document. *Hypertext browsers* enable to navigate through different existing models and to assess their usefulness based on the documentation provided.

Information retrieval mechanisms allow to search for modeling objects that fulfil certain model requirements. Moreover, hypertext may not only be restricted to model documentation. It can advantageously be combined with guidance in order to provide *background knowledge, explanation capabilities,* or *context-sensitive help f*or modeling steps.

ModKit - a process-centered modeling environment

A process-centered environment for chemical process modeling called ModKit (Bogusch et al., 1996; Bogusch et al., 1997) is currently being developed at RWTH Aachen. It consists of a graphical model editor that allows to create structural descriptions of process models according to a methodology proposed by Marquardt (1996). The structural description can be decomposed into arbitrary hierarchical levels with different model alternatives at each level of the hierarchy. A taxonomy of structural modeling objects (SMCs) has been implemented. Each SMC is associated with a set of characterizing attributes defining the scope and a corresponding behavioral description in an equation-oriented manner in order to support existing process simulators like SpeedUp (AspenTech, 1993) and gProms (Oh and Pantelides, 1996).

An *agenda manager* is available on request that guides the user by suggesting modeling actions to be performed next depending on the modeling context and state of the model (Lohmann and Marquardt, 1996). This agenda manager is being steered by a so-called process engine, which interprets Petri nets representing the modeling process. Special editors support the modeling engineer in customizing these Petri nets, and hence in improving the modeling process. Moreover, a *hypertext system* is available to create comprehensive documentation that can be linked with modeling objects in order to record all assumptions and decisions taken, capture experience gained during the model development, or to provide background knowledge related to physico-chemical phenomena.

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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.

Report from ASIM

ASIM Conference
and the First European Exhibition Simulation and Visualization S+V
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 Meetings, Tutorials, Parallel Sessions, Invited Papers, Industrial Forums and Sessions about actual simulation research programmes.

During the conference (November 12th - 14th, 1997) the first **European Exhibition Simulation and Visualization** – **S+V** will take place at the Westfalenhalle 5, in Dortmund. About 50 exhibitors of simulation and visualization software are expected.

For the Call For Papers 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-Mitteilungen

A complete list of all available *ASIM-Mitteilungen* can be obtained from Ingrid Bausch-Gall. It will also be part of the "*Jahresbericht 1996*", to appear in March.

ASIM Book Series

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

Series ***Fortschritte in der Simulationstechnik,*** published by Vieweg in Wiesbaden, Germany. Up to now 8 books have been published. Two more are finished and 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.

Series ***Fortschrittsberichte Simulation***, published by ARGESIM in 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,
- Description of simulation tools and their application.

The first two books of this series are now available, two more will appear in April:

C. Westerkamp: *Anwendung der Mehrgrößen-Parameterschätzung zur Simulation von linearen passiven Netzwerken.*

M. Salzmann: *Genetische Algorithmen in diskreten Simulationen.*

J. Plank: State Events in Continuous Modelling and Simulation – Concepts, Implementation and New Methodology (in English)

P. Acel: *Methode zur Durchführung betrieblicher Simulationen – Effiziente Optimierung der diskreten Simulation*

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,
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Prof. Dr. D.P.F.Möller, TU Clausthal;
Prof.Dr. F. Breitenecker, TU Vienna.

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ASIM Meetings to come

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.

June 5-6, 1997: Workshop: *7. Treffen der Arbeitsgruppe "Werkzeuge für Modellbildung in Umweltanwendungen"* in Oldenburg, Germany. Contact: Prof. Rolf Grützner, Universtität Rostock.

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

Spring 1998: 8th Working Group Conference of the ASIM Working Group "*Simulation in Produktion und Logistik*", Berlin, Germany

Working Groups (*Fachgruppen* FG)

ASIM's new structure has been approved by GI (*Gesellschaft für Informatik*). All working groups (now "*Fachgruppen*") are acting directly under ASIM (*GI-Fachausschuß*), the former subdivisions (simulation techniques and simulation applications) have been eliminated.

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

The next meeting is held together with the working group "*Simulation Technischer Systeme*" on March 3-4, 1997 at Universität Rostock. A report about the meeting will follow in the next issue.

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 und Erweiterung der Möglichkeiten für Modellbildung, Simulation und Analyse dynamischer Systeme*" will be held as joint meeting of the working groups "*Simulation in Medizin, Biologie und Ökologie*", "*Simulation und künstliche Intelligenz*" and "*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, Email: moeller@informatik.tu-clausthal.de
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 5874211, 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 is held together with the working group "*Simulationsmethoden und -sprachen für verteilte Systeme und parallele Prozesse*" at the institute of Prof. Dj. Tavangarian

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- G. Kampe, M. Zeitz (Hrsg.); Simulationstechnik, 9. Symposium in Stuttgart, Oktober 1994
- W. Krug (Hrsg.); Simulationstechnik, 10. Symposium in Dresden, September 1996

Schwerpunkte / Topics:

- Statusberichte über Simulation in den ASIM Fachgruppen / Status reports
- Allgemeine Monographien / General monographies
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- P. Acel; Methode zur Durchführung betrieblicher Simulationen - Effiziente Optimierung der diskreten Simulation (to appear 4/97)

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Email: 100564.302@compuserve.com

at Universität Rostock on March 3-4, 1997. A report about the meeting will follow in the next issue.

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
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"Simulation in Produktion und Logistik" (FG 6)

The last working group meeting took place on January 15th, 1997, at the University of Kassel at the institute of Prof. Reinhard. About 30 participants discussed the current activities of the ASIM Working Group:

1. The production of a new book titled "*Anwendungsorientierte Fallbeispielsammlungen*" will be published in summer 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.

2. The very successful *ASIM-Mitteilungen Nr. 7a* "*Leitfaden für Simulationsbenutzer*" is under revision; the new edition will be published in summer 1997.

3. The next event organized by the ASIM Working Group Simulation in Produktion und Logistik will be the 8th Working Group Conference, planned in spring 1998 in Berlin, Germany.

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 in der Betriebswirtschaft" (FG 7)

On March 3-5 1997, the 6th symposium "Simulation for Managerial Decision Support - New Tools and Approaches in Practice" takes 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. A report on the conference will be published in the next issue.

Speaker: Prof. Dr. W. Hummeltenberg, Universität Hamburg, Institut für Wirtschaftsinformatik, Max-Brauer-Allee 60, D-22765 Hamburg, Tel.: +49-40-41 23-4023, Fax: +49-40-41 23-6441, 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)

Speaker: Karl-Heinz Münch, SIEMENS AG, Bereich VT2 SYS, Ackerstraße 22, D- 38126 Braunschweig, Tel: +49-531 226 2225, Fax: +49-531 226 4305, Email: Karl-Heinz.Muench@BWG5.ERL1.siemens.net

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

On June 5-6, 1997 a workshop "*7. Treffen der Arbeitsgruppe Werkzeuge für Modellbildung in Umweltanwendungen*" will be held in Oldenburg, Germany.

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

AES

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Email: gironsi@dia.ucm.es

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

7. - 9. 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. Aus dem Programm:

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Inhalt:

ISBN 1-56555-082-X SCS Publications, San Diego, Erlangen, Ghent, Istanbul, 1995

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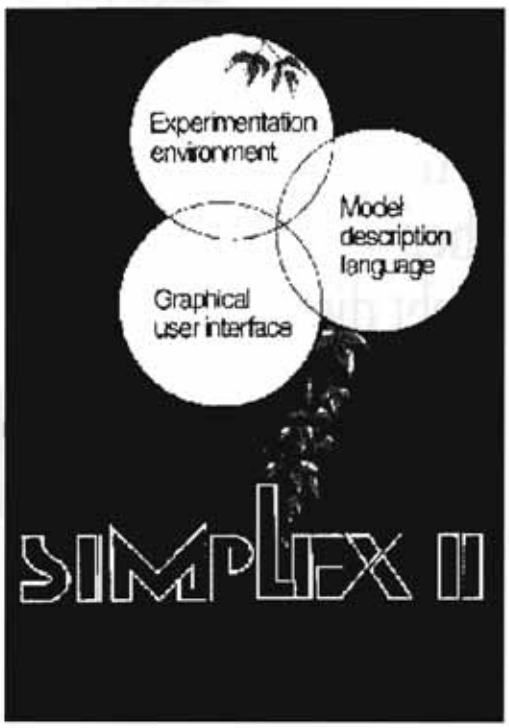

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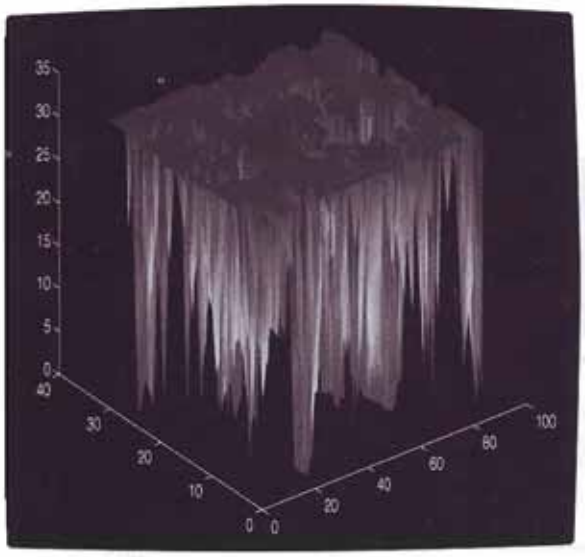

Dieser Oberflächenplot zeigt Stoßbeschädigungen einer Hubschrauber-Verbundwerkstoffstruktur. Zur Automatisierung zerstörungsfreien Prüfens klassifizierte die MATLAB Neural Net Toolbox Echos von Ultraschallsignalen. Die Daten wurden freundlicherweise von McDonnel Douglas unter einem AATD contract zur Verfügung gestellt.

Mit den MATLAB-Toolboxen, die von anerkannten Fachleuten entwickelt werden, können erprobte, dem neuesten Wissensstand entsprechende mathematische Vorgehensweisen erlernt und auf eigene Aufgabenstellungen angewandt werden.

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MATLAB IST DA! 5

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Die Sprache der Ingenieure

MATLAB—eine leistungsfähige, schnelle, interaktive Software—ist das beste Bindeglied zwischen Forschung und technischer Ausführung.

MATLAB ist eine Programmierumgebung für die Entwicklung von Algorithmen, Simulation und Analyse mit Visualisierung, numerischen Berechnungen und einer technischen Sprache.

Mächtig für Untersuchungen und Prototyping

In MATLAB werden Aufgabenstellungen und Lösungen so formuliert, wie es in der Mathematik üblich ist—ohne eine Zeile C oder FORTRAN Code zu schreiben.

Hunderte mächtiger Funktionen, die auf Effizienz und Zuverlässigkeit optimiert sind, sind mit einer leistungsfähigen und intuitiven Programmiersprache gekoppelt.

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Toolboxen bieten eine große Auswahl an optimierten Funktionen für Datenreduktion, Analyse, Modellierung und Systementwurf.

Hinter vielen technologisch fortschrittlichen Entwicklungen steht die Sprache der Ingenieure und Wissenschaftler:

MATLAB

McDonnell Douglas verwendet MATLAB zur Entwicklung von automatischen zerstörungsfreien Prüfprozessen für Hubschrauber, wie z.B. den Longbow Apache

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CROSSIM

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

Membership

CROSSIM currently has 56 individual members. The annual membership fee is equivalent of 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).
- Regularly organizing a simulation seminar held at the Faculty of Economics, University of Zagreb.
- Work on 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.
- A new simulation book in Croatian was recently published:
  Prof. dr. Vlasta Zanchi, "Simulation", University of Split, 1996, ISBN 963-6114-08-9
- Preparing publication of a booklet on CROSSIM society

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V. Ceric

CSSS

General Information

On November 19, 1996 the regular Board meeting of our society was held at the Technical University Brno, Czech republic. The main point of the meeting was the election of the steering committee of CSSS. The members of the steering committee for the next period stay the same. Currently CSSS has around 60 members in the 2 national societies, the Czech and Slovak Simulation Society is a member of EUROSIM.

Past Events

CSSS organized three conferences in the second half of the year 1996 and prepares three for this year.

The 18th international workshop "*Advanced Simulation of Systems*" was on September 17-19, 1996 in the Moravian city Zabreh na Morave, Czech republic. There were 47 participants from the Czech and Slovak republics and 5 from abroad.

The 12th International Conference on "*Process Control and Simulation*" (ASRTP'96) was on September 10-13, 1996 in Kosice-Zlata Idka, Slovak republic. There were 50 people from the Czech and Slovak republics and 35 from UK, Poland, Romania and Hungaria. In the section Modelling and Simulation there were 28 articles. Chairman of the International program committee was Prof. Ivan Plander, Academy of Science, Bratislava, Slovak republic.

The third International conference "*Electronic Computer and Informatics*" was on September 26-27, 1996 in Herlany, Slovac republic. The chairman of the conference. was Prof. M. Jelsina, Technical University Kosice, Slovac republic. There were 30 attendants from the Czech and Slovac republics and 5 from Poland and Romania. In the section Modelling and Simulation were 9 articles.

Coming Events

The **31th International Conference on "Modelling and Simulation of Systems" (MOSYS'97)** will be held on April 28-30, 1997 in Hradec nad Moravici, Moravia, Czech republic. The chairman of the international organizing committee is Dr. Jan Stefan. Hradec nad Moravici is an old Moravian town with a castle from the 13th century. One point of the topics of the conference is "Simulation case studies", for example from: biology and biotechnology, automatic control, ecology, electronic hydrodynamics, medicine, telecommunication, transport systems and manufacturing systems.

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. Jan Stefan, TU Ostrava.

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

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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 co-operation 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.

The contribution is divided in two options:

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

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

Becoming member of DBSS includes automatically being member of EUROSIM, the overall organisation of European Simulation Societies. DBSS members enjoy reduction of the fees attending the "EUROSIM events" which include congresses, conferences, symposia, workshops etc.

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

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

Coming Events

DBSS will organise during the first two days of the **EUROSIM 98 Congress** (organised by the SIMS society in Helsinki, Finland, April 14-18, 1998) a parallel session with the provisional title "**The impact of HPCN on parallel simulation**".

The provisional scientific committee for this session: J. Bruin, Corporate Communication 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 further information, please contact the EUROSIM '98 Congress office: P.O. Box 1301/INN, FIN-02044 VTT; Fax: +358 9 456 6752; Email: eurosim98@vtt.fi

One Day Symposium Neural Networks: It is the intention to organise in the autumn of this year a one day symposium at the Delft University of Technology about Neural Networks.

A neural network is a very popular simulation tool. It is a very users friendly black box procedure that is suitable for many types of applications. However, there are also some drawbacks. The resulting network seldom increases the insight into the process that is simulated. Furthermore the predictive capabilities of the network are not clear in case the circumstances change. As a result neural networks have to be used with great care.

On the one day symposium a number of presentations on applications of neural networks will be given. Also a few presentations on what is going on inside the black box have been scheduled. Both the practical and the theoretical presentations will increase the insight into possibilities as well as into the dangerous aspects of neural networks.

More detailed information will be announced in the next newsletter and will be mailed to the DBSS members.

Furthermore the **DBSS** has the intention to set up its own **home page** in the near future.

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.

Contact Addresses

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Events to Come

MOSIM'97
Systemes de Production et de Logistique

With regard to the success of the conference in Clermont Ferrand in June 1995 "*utilisation de la simulation en gestion de production*", the first conference of "*French Speaking Members about Modelling and Simulation*" is going to be organized in Rouen.

The meeting will take place in the Engineering College of Rouen "INSA", on June 6th and 7th 1997, and is supported by the French organizations ACET and FRANCOSIM.

For further information about registration contact:
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Fax: +33-2 35 52 83 32
Email: mosim@insa.rouen
WWW: http://www.insa-rouen.fr/com/mosim.html

M. Lebrun

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

One of the important activities of the Hungarian Simulation Society has been recently the co-sponsoring of the 10th European Simulation Multiconference of SCS in the Summer of 1996 where the chairman of our Society acted as the general chairman. The conference was held with success and as we have already indicated earlier a large number of participants of many countries from all over the world attended. The tutorials in leading edge areas have also been of great interest.

After the official opening of the Hungarian Center of the International McLeod Institute of Simulation Sciences last year – to the activities of which HSS is strongly related since our chairman was nominated as its director – started its work and intends to contribute to the establishment of contacts for joint projects in simulation.

In 1997 meetings on problem solving by simulation in different fields are planned.

Special Note

Please note that recently our phone and fax numbers have changed as indicated in the contact address.

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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 Addresses

For further information or application for membership, please contact:

ISCS
c/o Dipartimento Ingegneria Informatica
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

On December 18-19, 1996 the annual conference of ISCS was held in Rome. The conference involved 8 sessions with 33 contributed talks selected by the Scientific Committee composed of F. Maceri, University of Rome "Tor Vergata" (Chairman); F. Cennamo, University of Naples; B. Ciciani, University of Rome "La Sapienza"; L. Donatiello, University of Bologna; V. Grassi, University of Rome "Tor Vergata", G. Iazeolla, University of Rome "Tor Vergata"; M. Savastano, CNR; S. Tucci, University of Rome "Tor Vergata".

The contributions covered several topics, including theory, tools and applications. In particular, System Simulation (9 papers), Simulation in Transportation and Traffic Systems (10), Performance Analysis (5), Simulation of Dynamic Systems (3), Simulation Methodologies and Tools (3), Concurrent Simulation (3).

Persons interested to contact an author or buy a copy of the proceedings can ask at the ISCS secretariat. The following publications are in English:

"Design optimisation of non linear problems", G. Chiandussi (Politecnico di Torino), E. Duni, R. Fontana (Centro Ricerca FIAT), P.M. Calderale (Politecnico di Torino)
"Computer simulation methodologies in engine design optimization", S. Filippone (IBM Semea), P. Nobile (Piaggio) e F. Papetti (IBM Semea)
"A network simulation model of railroad lines using slam-system", S. Fanelli e F.Polito (Università di Roma "Tor Vergata")
"Pull strategies in airport operations", M. Lucertini, S. Smeriglio (Università di Roma "Tor Vergata") e D.Telmon (Tradeoff)
"Parallel algorithms for transportation assignment models", F. Russo e A. Vitetta (Università di Reggio Calabria)
"Dynamic extraurban road assignment with c-logit path choice model", U.Crisalli (Università di Roma "Tor Vergata")
"Estimates of FPT densities by simulation of normal processes with oscillatory thresholds", E. Di Nardo (Università della Basilicata), E. Pirozzi, L.M. Ricciardi (Università di Reggio Calabria), S. Rinaldi (Università di Napoli "Federico II")
"A new approach for solving the first zero-crossings problems in electronics", A. Molinaro (Università della Calabria), C. Pizzuti (ISI-CNR), Y.D. Sergeyev (Novgorod State University)
"Computer simulation of the mechanical response of structurally complex clayey soils", F. Federico e C. Callari (Università di Roma "Tor Vergata")
"Modelling of ultrasonic waves for the measure of damage growth in concrete", R.S. Olivito, P. Stumpo, L. Surace (Univ. della Calabria)
"Remote operations on scan converters", P. Arpaia, F. Cennamo (Università di Napoli "Federico II"), P. Daponte (Università di Salerno), M. Savastano (CNR)
"User's behaviour simulation of intercity rail service choices", A. Nuzzolo (Università di Roma "Tor Vergata")
"A methology for modeling and simulating concurrent systems", M. Bernardo (Università di Bologna)
"State query time warp: a time warp based mechanism for the distributed simulation of state dependent performance models", A. Fabbri (Università di Bologna)
"A parallel algorithm for on line simulation and control of discrete event systems", A. Loretucci, F. Martinelli, S. Nicosia e P. Valigi (Università di Roma "Tor Vergata")

This congress was also the occasion to award Prof. Erol Gelenbe (Duke University and University of Paris 7) with the Laurea Honoris Causa in Computer Engineering from the University of Rome "Tor Vergata".

Michele Colajanni

SIMS

General information

SIMS is the Scandinavian Simulation Society with members from the four Nordic countries Denmark, Finland, Norway and Sweden. The SIMS history goes back to 1959. SIMS' matters are taken care of by a board, the ombudsman and the treasurer. SIMS' board has eight members – two from each country. The annual meeting takes place in connection with the conferences. Usually the board meets a second time per year. The bylaws are written in Swedish and have recently been proposed updated.

How to join SIMS?

From 1996 the basic membership is free. You may register as a member by sending a mail with personalia to the address

sims@ecy.sintef.no

As a member you will receive invitation to the conferences and other information related to simulation. You will also get a discounted conference fee on the SIMS conferences.

Individual subcriptions for a discounted price to *EUROSIM - Simulation News Europe* and *Simulation Practice and Theory* are available.

The SIMS conferences

The annual SIMS conferences are organised by the four membership countries in rotation. The previous conference was SIMS'96 in Trondheim, June 11 - 13. A few copies of the proceedings are still available at a price of NOK 300. The next conference is planned to take place in Finland.

For more information visit the Internet address **http://www.itk.unit.no/SINTEF/sims.html**

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Torleif Iversen

SLOSIM

On November 20, 1996 the regular annual assembly of our society was held at the Faculty of Electrical Engineering, Ljubljana with the following agenda: report of the activities in the past period, financial report, report of the supervisory board, plan of activities for the year 1997.

Some important data in conjunction with the activities in 1996:

- contributions in SNE, presentation of Slovene simulation groups,
- SLOSIM orders 74 copies of SNE, 10 copies of Simulation Practice and Theory,
- collecting of new members (currently 85 members),
- 2 presentations of groups,
- SLOSIM becomes a full member of EUROSIM,
- co-organization of the ERK 96 conference,
- co-operation in the organization of the ICMMB 96 international conference in Ljubljana,
- 2 invited lectures.

Some items in conjunction with future plans:

- continuation of representative group meetings,
- co-operation with EUROSIM, SNE, ...
- lectures of visiting professors,
- dissemination of information,
- co-organization of the ERK 97 conference,
- collecting of new members (also from industry),
- collecting of sponsors.

The Ministry of Research and Technology refused to cover (the part of) the expenses for SNE and SIMPRA as a kind of SLOSIM membership fee to EUROSIM. The reason is that our society is treated as a technical (professional) and not as a scientific organization. The fact is that the majority of our members come from universities in spite of the fact that our wish was to attract also people from industry. As the income from the membership will not cover all expenses, the board will have to decide to reduce the number of SNEs and SIMPRAs in the near future. We also hope that the EUROSIM activities to lower the expenses for SNE will be successful.

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Borut Zupancic

UKSIM

United Kingdom Simulation Society

Yes, the Society's name has changed! This is to avoid confusion with another professional society in a quite different area with a similar name.

A one day meeting organised by Richard Zobel (Manchester University) at Salford University on 31st October 1996, was well attended. The meeting was in tribute to Prof. John Hay (Obituary in the Nov, 1996, issue of SNE) and included talks on Space Simulations and on the Interface between Discrete and Continuous Simulation. The speakers were: Geoff Mortimer, Stig Mejnertson, Patrick Holmes, Richard Zobel, Peter Thomasson and Paul Webster. Sincere tributes were paid to John, and it was particularly warming that Beryl Hay, John's wife, was present to receive them.

It is hoped to hold some joint one day meetings with the newly reconstituted Simulation Study Group of the UK Operational Research Society, details of this will be reported in the next issue of SNE.

The new membership secretary is:

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FAX +44 171 3201717
email: gjones@lgu.ac.uk

He has been busy preparing and reorganising the mailing list, so if you think you are on it but have not heard from him, please contact him straightaway.

The next national conference, **UKSIM 97**, draws near. The dates are 23-25th April 1997. It should not be too late to register for this conference when you receive this issue. The conference venue is the Keswick Hotel, Lake District, which offers a relaxed and very attractive venue for the meeting.

The conference is very good value for money, with many items included which are normally separately charged. It includes in particular, published conference proceedings of accepted papers. The Conference Chair is Graham Birtwhistle, Division of OR and Information Systems, School of Computer Studies, The University, Leeds LS2 9JT, tel +44 113 2431751, email graham@scs.leeds.ac.uk.

Russell Cheng

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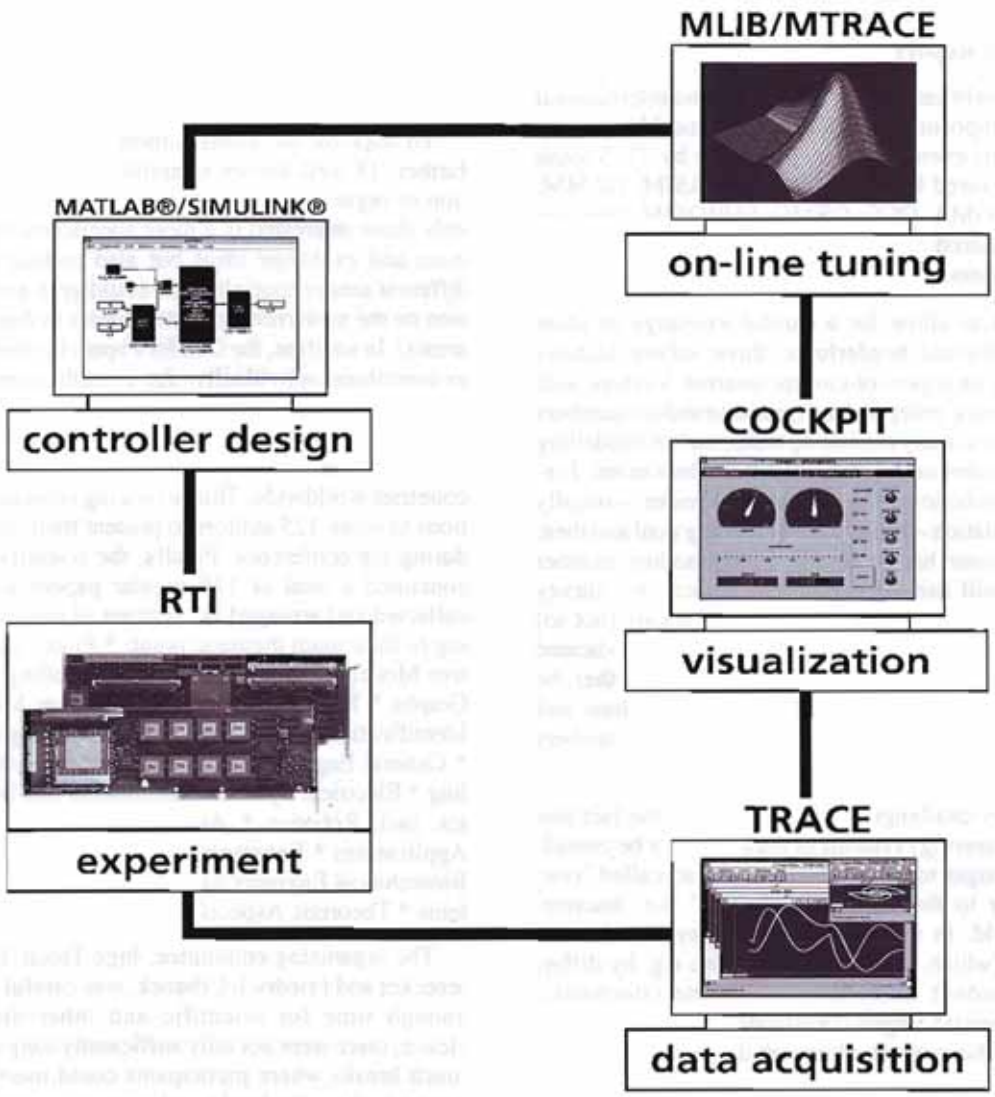

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IMACS

2nd MATHMOD Vienna
2nd IMACS Symposium on Mathematical Modelling
Conference Report

During February 5 - 7, 1997 the second international IMACS symposium took place at Technical University Vienna. This event was sponsored also by TU Vienna and cosponsored by IFAC, IAMCM, ASIM, GAMM, VDI/VDE-GMA, OCG, OEMG, EUROSIM. The conference gathered 211 scientists form 27 countries from four continents.

In order to allow for a fruitful exchange of ideas across traditional borderlines, three survey lectures were given on topics of current interest. Vectors with elements being 'independent' (pseudo)random numbers are needed for many modelling tasks, such as modelling of measurement noise, stochastic disturbances etc. Frequently, prediction of a systems behaviour – usually called simulation – is the main modelling goal and then, the practitioner has to decide which random number generator will suit his needs best. Hence, in a survey entitled "Good random number generators are (not so) easy to find", Peter Hellekalek (Salzburg, A) indicated why which difficulties may and do occur. Further, he reviewed in a critical manner recent algorithms and software tools for the generation of random numbers and vectors of such numbers.

A further challenge to all modellers is the fact that most (engineering) systems of today can not be considered any longer to belong either to the so-called "continuous" or to the so-called "discrete" (i.e. discrete-event) world. In most systems of today "continuous' processes (which can be described also e.g. by difference equations) interact with discrete (stochastic) events. Sebastian Engell (Dortmund, D) working on the frontier of this new development discussed in his survey on "Modelling and analysis of hybrid systems" various aspects and recent trends in this field.

Among others, growing demands on the performance of technical systems forced also engineers working in such traditional areas as mechanical or electrical engineering, to pay more attention to all sorts of uncertainties occurring in such systems. Moreover, expenses for the modelling task must be kept low and modelling must often be done within short time. Hence, it is not astonishing that slogans such as "fuzzy modelling" or "qualitative model" are attractive not only to scientists but also to those working in an industrial environment. In the third invited lecture entitled "Qualitative modelling of dynamical systems – motivation, methods, and prospective applications", Jan Lunze (Hamburg, D) did not only survey the principle lines of current research but explained also the main ideas of an automata-theoretic approach which was successfully used in supervisory control.

To improve the aforementioned exchange of ideas further, 18 well-known scientists followed the invitation to organize a so-called special session where not only those interested in a more specialized topic could meet and exchange ideas but also colleagues with a different area of specialization could get a good impression on the most recent research topics in this particular area(s). In addition, the Call for Papers invited scientists to contribute individually. As a result, some 180 extended abstracts were submitted and were carefully reviewed by the 37 members of International Program Committee (chaired by Inge Troch) coming from 18 countries worldwide. This reviewing resulted in invitations to some 125 authors to present their contribution during the conference. Finally, the scientific program contained a total of 178 regular papers which were collected and arranged in 16 string of sessions according to their main thematic point: * Fuzzy and Qualitative Modelling * Automation of Modelling and Bond Graphs * Petri Nets and Discrete Event Modelling * Identification * Software Tools * Modelling in Practice * General Engineering Applications * Traffic Modelling * Electrical Systems * Mechanics and Mechatronics, incl. Robotics * Automatic Control * Physical Applications * Environmental Systems * Biology and Biotechnical Engineering * Economic and Social Systems * Theoretic Aspects.

The organizing committee, Inge Troch, Felix Breitenecker and Friedrich Urbanek, was careful to provide enough time for scientific and other discussions. Hence, there were not only sufficiently long coffee and lunch breaks where participants could meet or, could have a look on the books and journals on display or on the 24 posters. These posters could be discussed with the authors during these breaks but especially during the special Poster Session where also a selection of the "best poster" took place. K. Kleemayr et al. with their poster on "Modeling of Stresses and Movements of the Seasonal Snow Cover with Finite Element Method" were the winner of the poster award consisting of a one year subscription to the journal "Mathematical Modelling of Systems". A second one-year subscription of this

journal was disposed of by lot among those conference participants who played an active part in this selection.

The written versions of the three invited lectures, of all contributions to the conference as well as abstracts of all posters are collected in a Proceedings volume (ISBN 3-901608-11-7), edited by I. Troch and F. Breitenecker. Moreover, the survey lectures and some 15 regular papers will appear also in a special double issue of the IMACS journal "Mathematics and Computers in Simulation". Selection of these papers is based on a second reviewing procedure based on full papers. It is to be expected that there are more contributions which merit publication in a scientific journal than can be included in this special issue. Hence, authors of such outstanding contributions will get an invitation to submit a suitably adapted an enlarged version to the one of the following journals into the scope of which the paper fits best: "Mathematical Modelling of Systems", "J. of Intelligent and Robotic Systems" and "Simulation Practice and Theory".

At the Heurigen

Moreover, a rich social program during the three conference evenings – a Get-Together-Party on the eve of the symposium, a serenade followed by a reception given by the rector of TU Vienna in the ceremony hall of the main building of TU Vienna and a traditional (and really Viennese) Heurigen evening – offered further possibilities to make friends with colleagues from other countries or, sometimes also from ones own town.

Finally, it should be mentioned that there were also several committee meetings during or immediately after the conference. Among them was a meeting of the IMACS TC-2, the Technical Committee on "Mathematical Modelling". There the recommendation was given to organize – in view of the growing interest in a conference like this – a 3rd MATHMOD conference during February 2000.

Inge Troch, Vienna

15th IMACS World Congress 1997 on Scientific Computation, Modelling and Applied Mathematics

August 24-29, 1997
Berlin / Germany

The International Association for Mathematics and Computers in Simulation (IMACS) is preparing a world congress which aims to provide a platform for research work in the fields of scientific computing, modelling and applied mathematics. Resaerchers and interested participants the world over are warmly invited to attend the conference.

Topics: Methods for ODE's, SDE's and PDE's * Integral Equations *Computational Linear Algebra * Parallel Computing * Computational Physics/Chemistry/ Biology * Computational Acoustics * Computational Fluid Dynamics * Computational Optimization * Nonlinear Science * Knowledge Based Systems * Symbolic Computation * Modelling and Simulation * Applications in Engineering, Control Systems, Robotics, Biology, Medicine, Economics, the Environment

General Chair: A. Sydow, GMD FIRST, Berlin

Honorary Chair: R. Vichnevetsky, President of IMACS

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URL: http://www.first.gmd.de/imacs97/

GI
German Society for Computer Science

The German Conference on Bioinformatics GCB'1996, Meeting Report

At the beginning of 1992 the German Society for Computer Science (GI) founded a new section which is called "*Informatik in den Biowissenschaften*" (GI-FG 4.0.2). One goal of this group is to close the gap between Computer Science and Biology, which was emphazised by the ministry of research and technology. The main goals of this section are: to involve biotechnology research and methods of Computer Science, to develop new foundations, methods, and tools to solve problems in the field of Biology, to increase the innovative interactions between biology and Computer Science.

Presently, this group has organized different workshops and conferences: http://www.imise.uni-leipzig.de/org/Veranstaltungen.htm

The GI organized in co-operation with the German Society for Chemical Apparatus, Chemical Engineering and Biotechnology (DECHEMA) and the German Society for Medical Informatics, Biometry and Epidemiology (GMDS) the first Intemational German Conference on Bioinformatics, which took place from September 30th to October 2nd, 1996, in Leipzig (Germany). The members of the Organizing Committee were R. Hofestädt (University of Magdeburg), T. Lengauer (GMD St. Augustin), M. Löffler (University of Leipzig) and D. Schomburg (University of Köln).

The main topics of this conference could be described by: Application of Database Systems for the Human Genome Project (HGP), Sequence Analysis, Modeling and Simulation of Gene Regulation, Molecular Modeling und Molecular Design, Formal Languages and DNA, Metabolic Network Control.

Based on these topics the international Program Committee selected 22 talks from more than 120 proposals. In addition to these oral presentations the Program Committee selected 69 posters and computer demos.

Prof. Dr. P. Schuster discussed new developments in biopolymer research. The conventional approach studying the relation between sequence, structure, and function of biopolymer molecules is based on the one sequence – one structure – function approach. An understanding of molecular evolution in theory and practice, however, requires information that can be derived only from a different strategy in analyzing sequence-structure relations. These new problems of biophysics call for a global analysis of sequence-structure relations based on new methods of sequence analysis.

Prof. Dr. T. Smith mentioned that 1799, near the Egyptian town of Rosetta, an inscribed basalt tablet was found that opened the way to the interpretations of ancient Egyptian hieroglyphs. Three inscriptions describing the same events had been recorded in three different written languages, one of which could readily be read, one of which much was understood, and final one for which nearly nothing was interpretable. He mentioned that this story has an analogy in modern molecular biology where this is true whether or not one thinks in linguistic terms about molecular genetics. Surely the main metabolic and cellular functions are very nearly equivalent texts in Humans, Drosophila and Yeast, but recorded in quite different genetic dialects. We know much of this text in Drosophila and Yeast, and most of what we still cannot read can be translated through the trial and error of direct experimentation. Whereas in the third case of the Human Genome, we are highly constrained in the directed approach.

Prof. Dr. P. Prusinkiewicz presented applications of L-Systems. His talk showed that recent advances of computer graphics have made it possible to visualize mathematical models of biological structures and processes in a variety of ways, from schematic to photorealistic. The resulting images, animations, and interactive systems are useful as research and education tools in biology. His talk focused on the developmental models of branching plant structures expressed in terms of Lindenmayer systems.

Prof. Dr. M. Conrad presented an overview of the research field of molecular computing. He mentioned that natural biomolecular systems process information in a radically different manner than programmable machines. Conformational interactions, the basis of specificity and selfassembly, are of key importance. He presented a gedanken device that illustrates how the fusion of information through conformational selforganization can serve to enhance pattem processing at the cellular level.

The workgroup of the German Society for Computer Science decided to continue the annual conference in an international level in co-operation with the DECHEMA workgroup. Therefore, the next international German Conference on Bioinfonnatics is going to take place in Munich in 1998.

During the last two years research institutes and biochemical companies have built up Bioinformatic Institutes in Germany. Based on these activities Departments for Bioinformatics where founded at different German Universities. These departments belong to different faculties. A lot of co-operation is done in the field of Medical Informatics. Furthermore, some Faculties of Chemistry and Biology have already built up Departments of Bioinformatics. Based on these activities, the German Society for Computer Science is defining the curricula bioinformatic: bioinfo-curric@techfak.uni-bielefeld. de.

For further information and abstract-books of the GCB'96 please contact: Prof. Dr. R. Hofestädt, Otto-von-Guericke-Universität Magdeburg, Institut für Technische Informationssysteme, Angewandte Informatik / Medizinische Informatik und Bioinformatik, Universitätsplatz 2, D-39016 Magdeburg, Germany, Email: hofestaedt@iti.cs.uni-magdeburg.de

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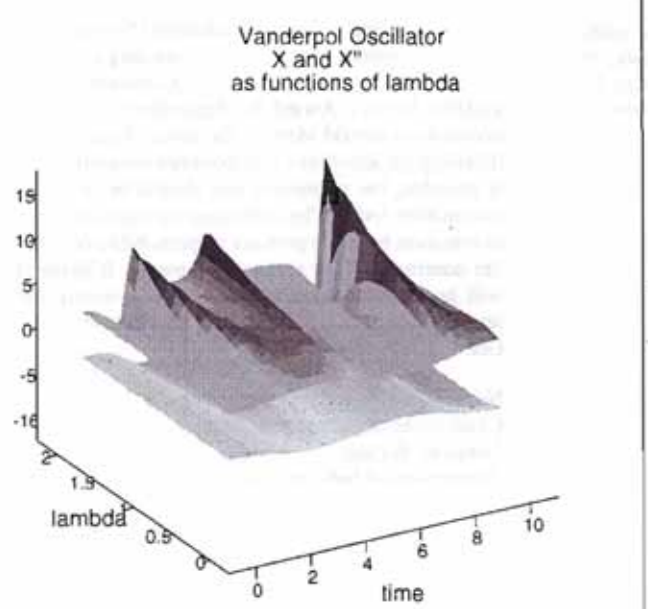
ACSL Code for C and Ada code generation from the Graphic Modeller, for controller design and rapid prototyping.
ACSL Real Time for hardware-in-the-loop applications. Special functions available in ACSL to interface with commercial I/O cards.
ACSL BioMed for simulation of clinical trials in drug development.

ACSL Math: Parameter Sweep Example



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SCS - Society for Computer Simulation

1996 Winter Simulation Conference, Report

It was the second time that we attended the Winter Simulation Conference (WSC). In December 1995 the conference took place in Arlington, near Washington D.C. For us it was nice to meet many famous simulation people in person whom we only knew by name or had contacted per email only. The WSC has a long tradition (in 1996 it was the 28th conference) and some special activities which are maintained each year. It is a main event for people in the discrete simulation area.

In 1996 the conference location was the Hotel del Coronado near San Diego in California from December 8 to 11. The program featured 11 parallel sessions including Introductory and Advanced Tutorials, State-of-the-Art-Reviews, Analysis and Modeling Methodology, Software Presentations, Manufacturing and General Applications and a so-called "Simulation Pipeline". The keynote address was given by Karl G. Kempf of Intel Corporation about successes, failures and questions in simulating semiconductor manufacturing systems. During the opening session Thomas Schriber received the INFORMS College on Simulation Distinguished Service Award. Traditional software user group meetings allowed interesting discussions between users and vendors. There were more than 600 participants, 57 came from Europe. The exhibition area, where most of the leading vendors were present, was a central meeting point during the breaks. The proceedings are quite voluminous. For the next conference it is planned to offer the proceedings also on CD.

WSC'97 will take place in Atlanta, Georgia, December 7-10, 1997. For information please contact: David Withers, Lexis-Nexis, P.O.Box 933, Dayton, OH 45401, USA, Tel: +1-937 865 1912, Fax: +1-937 865 1655, Email: david.withers@lexis-nexis.com or visit http://www.wintersim.org in the WWW.

We have been able to make and renew a lot of contacts. Also we had the opportunity to present the activities of EUROSIM and to promote *EUROSIM - Simulation News Europe*. The photo, taken outside of the Hotel del Coronado, shows from left to right: Felix Breitenecker (SNE editor), Dan Brunner (WSC'96 general chairman), James Swain (WSC'96 program chairman), Barry Nelson (WSC'97 program chairman), Irmgard Husinsky (SNE editor), David Withers (WSC'97 general chairman).

SNE Editors

Call for Nominations for the INFORMS College on Simulation **Distinguished Service Award**

To recognize individuals who have provided long-standing, exceptional service to the simulation community, the Institute for Operations Research and the Management Sciences (INFORMS) College on Simulation has established its Distinguished Service Award, which may be given no more often than annually to selected individuals. Sustained service to the simulation community should extend over a period of 15 to 20 years or longer and be acquitted with distinction. The concept of service for this award does **not** include teaching or research contributions. Areas of volunteer service include but are not limited to:

1. elected offices in simulation societies;
2. editorial responsibilities for simulation such as department editor, area editor, and editor-in-chief;
3. conference responsibilities involving simulation such as program chair, proceedings editor, general chair, and being a member of the organizing or program committee;
4. appointed positions for simulation-related activities such as serving on committees and being a newsletter editor; and
5. undertakings and actions that promote simulation in the "larger community".

Nominations for the Distinguished Service Award can be made by anyone and are made by sending a letter of nomination to the Chair of the Selection Committee for the Distinguished Service Award by September 1, 1997. Letters of nomination should identify the areas of exceptional service, detailing the activities of the nominee deserving of this award. If possible, the nominee's vita should be included with the nomination letter. The individual or individuals making the nomination have the primary responsibility of justifying why the nominee should receive this award. If given, the award will be presented December 8, 1997, during the opening session of the 1997 Winter Simulation Conference in Atlanta, Georgia, U.S.A.

Nominations should be sent to the
Chair of the Selection Committee:
James R. Wilson
Department of Industrial Engineering
Riddick Labs, Yarbrough Drive
North Carolina State University
Raleigh, NC 27695-7906, USA
Internet: jwilson@eos.ncsu.edu
Phone: +1-919 515-6415, Fax: +1-919 515-5281

Presentation of Simulation Centers

Simulation in Magdeburg

Organization

Simulation in Magdeburg –this is not a private subject of a single institute or department. Simulation is the subject of scientific and tool for practical work at least in the *Institut für Simulation und Graphik* (ISG) at the Universität Magdeburg, the *Institut für Fördertechnik, Stahlbau und Logistik* (IFSL) at the Universität Magdeburg, the *Fraunhofer Institut für Fabrikbetrieb und Automatisierung* (IFF) Magdeburg and the *Institut for Automation und Kommunikation* (IFAK) Magdeburg/Barleben.

Simulation History

Simulation in Magdeburg has a historical background which goes back to the 60ies. The first analogue computer was installed in the late 60ies and used for continuous modeling and simulation (R. Hohmann). An electro-mechanical simulator for material flow systems was installed in the early 70ies (D. Ziems) and the first lecture on discrete event simulation using was held at that time, too (P. Lorenz). Simulation tools and applications have been subject of diploma theses since the 70ies and of Ph.D. theses since the 80ies. Subject of research and development have been a FORTRAN based GPSS simulator SIMFOR (R. Knocke), and a continuous system simulator SIM-SKR (R.Hohmann) for minicomputers, a Pascal based simulator SIMPC for PCs (Th. Schulze), simulation of DBMS (A. Winkler and V. Toleva), interaction with simulators (F. Preuss), decision table techniques for modeling control strategies (H. Herper), real time applications (R. Koeppe) and simulation environments (V. Hinz).

A Students' Simulation Lab founded in 1985 has been involved in a series of practical simulation and animation projects and services, most of them in manufacturing and conveying systems simulation.

In 1990 the *Institut für Simulation und Graphik* on the *Fakultät für Informatik* was established, which is indication of a strong interest in all fields of combining simulation, computer graphics and image processing.

In 1992 the Fraunhofer IFF was founded. Its Department for Planning and Logistics uses simulation and VR methods for optimization of production and service processes (E. Blümel).

Teaching Simulation

Since 1990, the ISG offers a special curriculum "Simulation and Graphics" for Computer Science students, which includes five courses in simulation and one course in animation. In the courses the students are introduced to discrete and continuous simulation and simulators, mathematical and methodical foundations of simulation, simulator architecture and construction and to simulator applications.

Research Projects and Fields of Interest

- Opening up new application areas (e.g. traffic, manufacturing, emergency handling, and safety systems) for multi-purpose microscopic process models and for HLA based federations,
- Detailed modeling of workers in manufacturing systems,
- Integration of simulation into different environments, including new instruments of data acquisition and new tools for the hardware-in-the-loop simulation,
- Layout- and data-based generation of simulation and animation models,
- Concepts and prototypes for Web supported teaching and studying simulation and animation,
- Design, implementation and evaluation of simulator and animator prototypes,
- Tools and methods for parallel simulation,
- Comparison of simulator speeds and efficiency,
- Simulation and visualization services based on all kinds of tools.

Simulation Conferences

Each year in March the ISG, IFSL and IFF organize a conference (supported by ASIM and SCS) on simulation and graphics related topics.

Simulation and Animation in the W3

Please visit the following URLs:

On the server
`http://simsrv.cs.uni-magdeburg.de/cgi-bin/simpage` (Simulation in MD)
`~deussen/tagung97.htm` (1997 March Conf.),
`sim/vmaerz96/vortrag/` (S&A in the W3),
and on the server
`http://isgnw.cs.uni-magdeburg.de/~pelo/sim1d/sim1.htm` (W3 based Lecture Notes),
`~pelo/sim1d/s4/s41/s41.htm` (Joe's Barber Shop),
`~pelo/pelo.htm#Publ` (P.Lorenz Homepage), and
`http://simos2.cs.uni-magdeburg.de/Skopeo/Ani.html` (Java based Animation).

Peter Lorenz, Universität Magdeburg, FIN-ISG, Universitätsplatz 2, D-39106 Magdeburg, Tel: +49-391-67-18534, Fax: +49-391-67-11164, Email Pelo@isg.cs.uni-magdeburg.de

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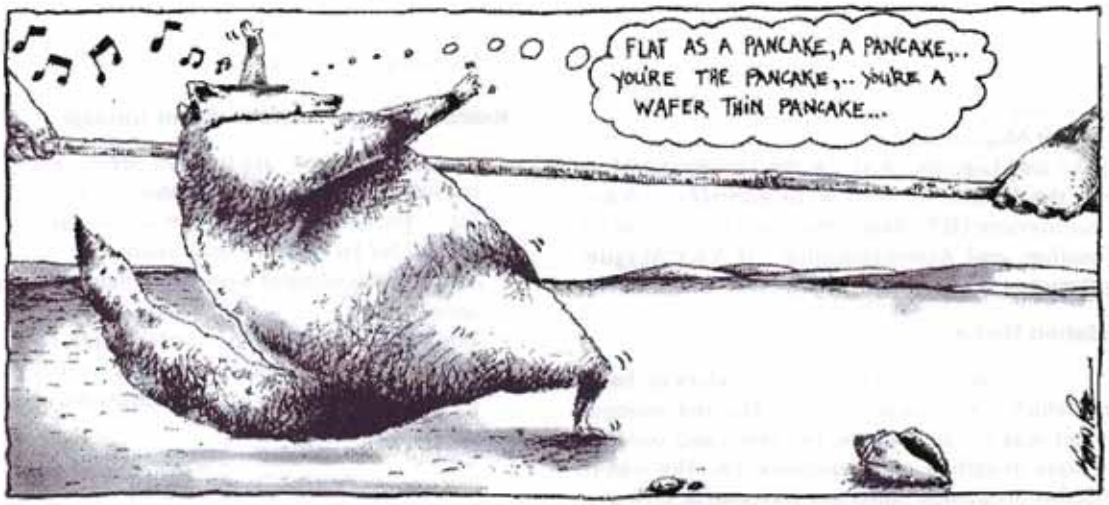

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Laboratory of Biocybernetics, University of Ljubljana

Laboratory activities

The activities of the Laboratory of Biocybernetics cover biomedical engineering and cellular engineering research areas: use of electric currents and fields for soft tissue repair, for electrotherapy and electrochemo-therapy of tumors, and for immunomodulation. Modelling and simulation are involved in all these activities.

Soft tissue repair by means of electric currents: For the last eight years, a multicentre clinical study has been conducted which has proved with statistical significance that electrical wound healing is a real phenomenon and not an artefact. In order to enlighten the mechanisms of accelerated wound healing, the current activities are comparative analysis of signal molecules of the wound healing process in the non healing period and during the healing period initiated and sustained by electrical stimulation. Using a 3D finite elements model of a wound, we studied electric current and field distribution within the treated wound. The results enabled us to improve both the electrode shape and the electric field configuration *in vivo* in order to optimize therapeutic effects and to compare *in vivo* and *in vitro* results.

Electrotherapy and electrochemotherapy in experimental and clinical oncology: Electric current as an antitumor agent has been proposed but not sufficiently investigated in the past. The exact mechanisms are unknown, yet we have investigated the effects of electrotherapy on tumor growth with respect to electrode material, electrode configuration, intensity of current, duration of electrotherapy and therapeutical schedule. Special interest has been oriented towards the study of mechanisms involved in antitumor action of combined treatment with electric current and different biological response modifiers and anticancer drugs. Parallel to *in vivo* studies, effects of electrotherapy on normal and transformed cells *in vitro* have been carried out, with the goal to reveal the mechanisms of electrotherapy at the cellular level. Recently, a clinical study of electrochemotherapy with bleomycin and cisplatinum has been initiated in collaboration with Institute of Oncology, Ljubljana. A 3D finite elements model of a mouse with subcutaneous tumor was used to study electric field distribution for different types of electrotherapy with low intensity DC electric current. We also developed a farmacokinetic-pharmacodynamic model of electrotherapy with bleomycin. Using this model, a series of simulations at different electrode configurations and current intensities were carried out, yielding the distribution of chemotherapeutic within different compartments of the model. The results of the latter study imply that electric current affects tumor physiology rather than interaction on the cellular level (drug uptake in the cell).

Electroimmunomodulation: Immunological response of the system subjected to electrotherapy may play an important role in the explanation of observed phenomena (i.e., wound healing and tumor treatment). Therefore, the investigation of growth, functions, and properties of immune cells following the exposure to low-level currents/fields *in vitro* have been conducted. Different models of influence of electric field on Ca^{2+} and H^{+} ions flux through membranes of excitable cells were built.

Hardware equipment: 1 HP UNIX workstation, 15 PC computers in network, scanner, a near-infrared spectroscope, 3 multichannel stimulators (Grass), an electroporator (Jouan), various electronic devices (such as oscilloscopes, function generators, current and voltage sources and amplifiers, measurement instrumentation).

Software equipment: Specialized modelling and simulation languages and packages: MSC-EMAS (numerical computation of EMF with finite elements method), BEASY (numerical computation of EMF with boundary elements method), SAAM (modelling and simulation of farmacokinetic systems). General modelling and simulation languages: SIMCOS, MATLAB / SIMULINK (numerical analysis), Mathematica (analytical and numerical analysis). Programming languages: Borland C++, Turbo Pascal, Delphi

Recent achievements:

Between 1991 and 1996, teachers in our laboratory mentored 17 B.Sc. works, 9 M.Sc. works, and 6 D.Sc. dissertations. Within this period, we published 58 papers in international journals with SCI, and participated in international conferences with 85 contributions. In 1995, L. Vodovnik, D. Miklavcic and G. Sersa were awarded the National award of the Republic of Slovenia for Scientific and Research Achievements, which is the highest Slovenian award for scientific achievements.

In 1996, the laboratory was involved in research within 8 ongoing projects, 5 of them with international participation (established by Commission of the EU, PROTEUS Programme and The Royal Society of Great Britain).

The laboratory has official contacts with universities in Cambridge, Keele, Brussels, Bordeaux, Bielefeld, as well as with institutes and hospitals in Manchester, Phoenix, Villejuif (France), and City of Hope (California, USA).

Laboratory of Biocybernetics, University of Ljubljana, Faculty of Electrical Engineering, , Trzaska 25, SLO-1000 Ljubljana, Slovenia Tel: +386 61 1768 264, Fax: +386 61 1264 658, URL: http://lbk.fe.uni-lj.si

Design of a Unified Object-Oriented Language for Physical Systems Modeling

A technical committee (EUROSIM TC1) has been formed within the EUROSIM federation for the purpose of designing and promoting a unified object-oriented language for physical systems modeling. The main purpose is to facilitate easy exchange of models and model libraries. There is presently no language that fully supports this.

Modern techniques including non-causal modeling with true equations, the use of object-oriented constructs to facilitate reuse of modeling knowledge and graphical representations, should be available in a new language. There are already several modeling languages which partly support this available from universities and small companies. The design effort is an attempt to unify these concepts and to introduce a common syntax and semantics.

The design has already started within one action of the ESPRIT project "Simulation in Europe Basic Research Working Group (SiE-WG)". The language is called *Modelica*. The design group presently consists of about ten people who have made very good progress. However, many issues remain to be dealt with: incorporation of discrete features, working out detailed semantics, developing basic libraries, and documentation. The work has started in the continuous time domain since there is a common mathematical framework (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. Thus the short range goal is to design a modeling language based on 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.

Information about the Modelica development is available on the world-wide-web: *URL:* ***http://www.Dynasim.se/Modelica***. A mail server is available to register as a member of the *Modelica Special Interest Group* and to broadcast information to other members. We hope to be able to incorporate much of the experience available from simulation professionals into the language design. Requirements, proposals and other feedback is very welcome.

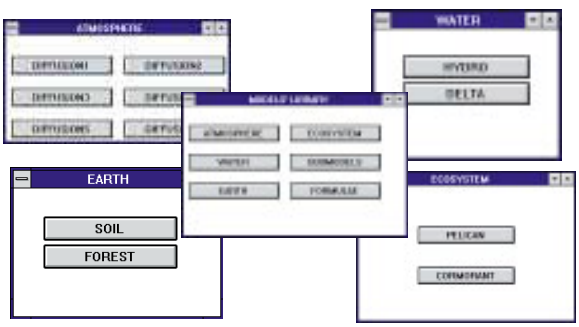
Dr Hilding Elmqvist, committee chairman, Dynasim AB, Research Park Ideon, S-223 70 Lund, Sweden, Tel: +46 46 182500, Email: Elmqvist@Dynasim.se

Library of Models for Simulation and Control in Ecology and Environment Protection

This library was set up to assist builders of information systems and/or of applications in the domain of ecology an environment protection.

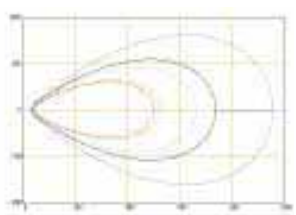
The library

- supplies complete models that allow to carry out simulation and control experiments on ecological systems and environment protection systems;
- assists users in building new models (submodels and computation formulae).
- is a hierarchically stuctured (the global level; the level of models for simulation and control for ecology, atmospheric, aquatic and terrestrial environment; the level of submodels (e.g. dynamics of populations); the level of computation formulae (e.g.pray-predatory relationship).



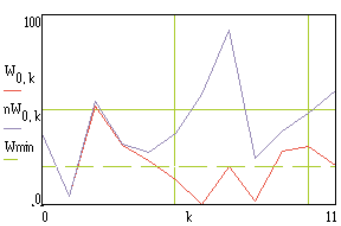
User Environment: Windows with library's push buttons

The selection of a model is made by slecting a push button with the mouse. Simulation and control results are graphically presented.

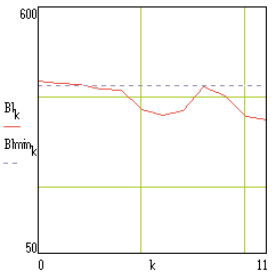


Diffusion of SO2

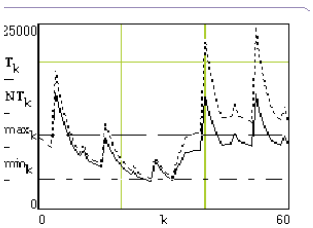
The models of atmospheric environment refer to the simulation and control of the diffusion of industrial chemical pollutants in the urban atmosphere (e.g. SO_2, NO_2, ethyl acetate, toluene), for one or several emission sources (the DIFFUSION model). The models of aquatic environment refer to the simulation and control of hydrological processes (water circulation, inflow and outflow of water, level, depth, volume of water, and water refreshment factor) (the HYDRO model), or complex hydrobiochemical processes (water chemistry/ nutrients, evolution of biological species a.s.o.) (the DELTA model). The models of terrestrial environment serve in the simulation and control of an agroecosystem (dynamics of the vegetal biomass, beans biomass, roots biomass, which depend on such restrictive factors as: solar light radiation, temperature, humidity, pH, etc.) (the SOL model), or a forestry ecosystem (dynamics of the wooden biomass, wreath biomass, roots biomass, which depend on the same restrictive factors) (the FOREST model).



Water refreshment factor



Dynamics of wooden biomass



Simulation of cormorant population dynamics

We would like to emphasize the ecological models of simulation and control of the dynamics of migratory birds (pelican) and nonmigratory birds (cormorant).

The models have been achieved by Mathcad under Windows, on a PC 486.

Users addressed by the library of models for simulation and control of ecological systems and environment protection system include:

- research workers, designers and programmers in research laboratories and computer centres of the institutes of ecology, biology, hydrology, forestry and agriculture, responsible for the quality and protection of the environment;
- designers of information systems and/or applications in ecology, biology, hydrology, forestry, in agriculture, responsible for the quality and protection of environment;
- teaching staff and students of faculties of ecology, biology, hydrology, forestry and agriculture.

Customer service covers: the model's library on a diskette for a PC 486; technical documentation; Technical assistance on implementation.

For additional information and demos please contact: Dr. Florin Stanciulescu, Research Institute of Informatics, Averescu Avenue 8-10, RO-71316 Bucharest, Romania, Fax: +40 1 312 85 39, Email: sflorin@ u3.ici.ro

ANA 2.5

ANA 2.5 is a CSSL based simulation system with a graphically driven frontend based on block scripts. It is a simulator for system analysis, simulation of linear, non-linear and switching systems but also for dealing with fuzzy and neural network systems. It has been developed at the Institute for Electrical Control Engineering of the Vienna University of Technology.

The motivation was i) a need for a simulator with a graphical realtime and data base gathering interface, and ii) a need for a freeware simulator to be used by students.

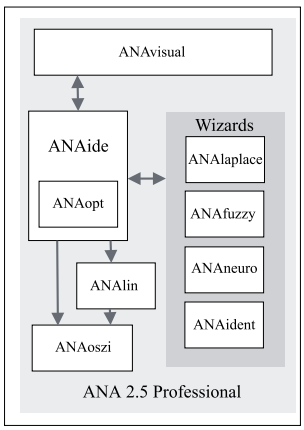


Fig. 1

ANA 2.5 is capable to handle state and time events at arbitrary precision. The very simple user interface allows newcomers to use the system from the scratch without any introduction. On the other hand the capabilities of ANA 2.5 also satisfy the need of the professional user in research and industry.

ANA 2.0 has been introduced in 1995 and over two thousand copies have been distributed. ANA has been continuously developed and many enhancements and extensions have been added. All these sum up to the present version ANA 2.5 Professional. Figure 1 shows the interaction of the main components.

1 ANAide - Integrated development environment
It is the heart of ANA. A graphical block builder assists the construction of circuits. For designing more complex blocks Wizards are used. They provide graphical editors specific to the selected technology. Furthermore ANAide manages the experiments.
2 ANAopt - Optimisation using parameter variation
Optimisation is a special form of an experiment. ANAopt offers facilities to automate the process of optimisation. Usable strategies comprise gradient based as well as stochastic and genetic methods.
3 ANAlaplace - Wizard for continuous and discrete transfer functions
This wizard uses computer algebra to create block scripts and allows polynomial expressions as input.
4 ANAfuzzy - Wizard for fuzzy elements
With the help of this module Mamdami fuzzy interference systems can be specified. Surface plots can be generated.
5 ANAneuro - Wizard for artificial neural networks
Artificial feedforward neural networks can be defined graphically. Serveral training methods based on backpropagation are available.
6 ANAident - Wizard for system identification
Estimation of linear transfer functions can be carried out by recursive parameter estimation. Together with ANArt (see below) ANA can be used for online identification. During simulation the result of the identification is displayed continuously.
7 ANAlin - Spreadsheet of transfer functions
The aim of ANAlin is to manage the analysis of transfer functions. Beside algebraic manipulations and transformations the transfer function can be shown as nyquist plot, bode plot as well as root locus or zeroes-poles plot.
8 ANAoszi - 2D-Visualisation
An arbitrary number of signals can be shown.
9 ANAvisual - Animation and interaction with simulated processes
ANAvisual introduces a window for placing "instruments". Buttons, knobs, analog and digital displays can be used interactively during simulation. This qualifies ANA even as tool for process monitoring and process control.
10 ANArt - Realtime simulation including "hardware in the loop"
ANA can interact with analog and digital PC I/O cards. The simulation can be done in realtime with "hardware-in-the-loop" elements.

ANA 2.5 is available as student version (without modules 2, 5, 9 and 10, no limitation on model size) free of charge via WWW. ANA 2.5 Professional is available on request. ANA 2.5 Professional requires Windows 95 or Windows NT. The student version also works with Windows 3.1x.

More information about this project can be obtained from http://www.iert.tuwien.ac.at/ana2 or from the authors J.W. Goldynia, J. Marinits, Institute for Electrical Control Engineering, Vienna University of Technology, Gusshausstr. 27-29/375, A-1040 Vienna, Tel. +43-1-58801 5220, Fax +43-1-5058907, Email: {goldynia,marinits}@iert.tuwien.ac.at

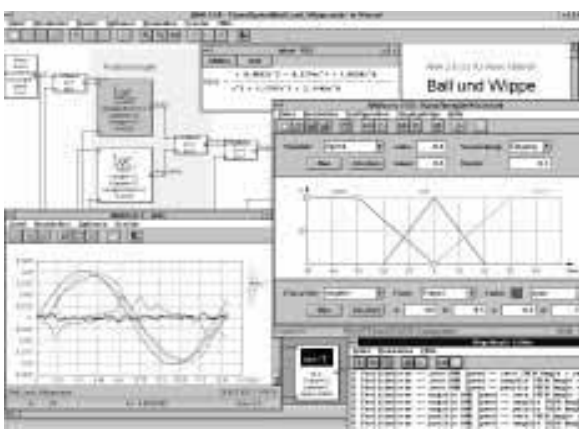


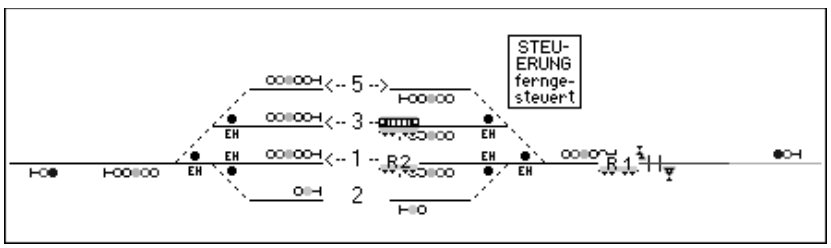
Fig 2: ANAide, ANAident and ANAfuzzy in action

F. Breitenecker, J. Plank, Dept. of Simulation Techniques, Vienna University of Technology, Wiedner Hauptstr. 8-10, A-1040 Vienna, Tel. +43-1-58801 5386, Fax +43-1-5056849, Felix.Breitenecker@tuwien.ac.at

Planning of Railroad-Management by Means of Discrete Simulation

For planning of railroad systems various tools exist. These tools usually deal with a quasi-stationary status of the railroad system. But for new planning tasks it is necessary to investigate also the dynamic behaviour of the railroad system. In a joint project of Alcatel Austria (Vienna), ARGESIM (TU Vienna) and Unseld & Partner (Vienna) discrete simulation was used to investigate a railroad system and to search for alternative development strategies.

A special simulation programme was developed in order to demonstrate the improved performance of new technologies even in case of a step by step upgrading of a railway section. This computer simulation programme serves as a planning and decision making tool for railway engineers and for the planning staff of railway operators.



Modelling. After checking the necessary requirements the simulator SIMPLE++ was chosen as the most suitable simulator for this task. SIMPLE++ is an object orientated simulator where the model can be built up from user-defined submodels etc. Therefore the model for this particular railway section can easily be adapted to many other railway sections. In addition SIMPLE++ is equipped with a very suitable animation which proved to be important for a presentation of the simulation results.

The examinations were performed at a single tracked local line, on a section with four stations. The figure above shows the modeling layout of details (four lines, signals and switches) of one of the coupled four stations investigated in this project.

The external installation consists of several different elements. Each of these elements can be found in many designs with various technologies:

- Switch: manual - by cable - electric - electric-hydraulic
- Derailing point: manual - by cable - electric - electric-hydraulic
- Signal: mechanic - by light

The elements of the external installation can be driven by the station's control point in three different ways: • mechanically • by relay • electronically

For the different types of technology of the external installation and the control points SIMPLE++ user-defined modules have been developed to support the setup of the model and to allow easy re-use.

A very important part of the computer simulation model is the reproduction of the activities of the area managers. The work of the area managers includes the implementation of track-actions. Four different types of track-actions can be distinguished: thoroughfare, arrival, departure and shunting. Each of these track-actions runs through five to six phases. These phases can vary in length of time depending on the technology of the external installation and the control points used:

announcement → control → control point → administration → signal operation → welcoming the train

In addition to the technology of the external installation and the control points the computer simulation programme can change the train schedule as well as the track-layout.

The computer animation is able to show the track-layout in a very detailed way. During the computer simulation each switch position, each signal position and each position of the trains can be traced.

The results of the computer simulation are as follows:

- table of allocated track capacity
- activities of the area managers and number of required area mangers
- delays and detours

The developed model was used for three different investigations. First the model was used to simulate the actual situation, in order to validate the model. Then two two alternatives (variant 1, variant 2) were investigated, where the railway section was step by step graded up with new technology. Results are given in the next table.

	technology of the		area	allocated track
	external installation	control point	managers	capacity
actual situation	switches operated by cable, mechanic signals	mechanical	8	33%
var. 1	electric-hydraulic	electronic	2	32%
var. 2	switches, lightsignals	automated electronic	1	31%

F. Breitenecker, P. Kralicek, ARGESIM TU Wien; R. Pfliegl, Alcatel Wien; Hans G. Unseld, Unseld+Partner, Wien
For information contact: F. Breitenecker, ARGESIM /Dept Simulation Technique, Vienna University of Technology, Wiedner Hauptstraße 8-10, A-1040 Wien; Tel +43-1-58801-5375, Fax: +43-1-5874211, Email: Felix. Breitenecker@tuwien.ac.at

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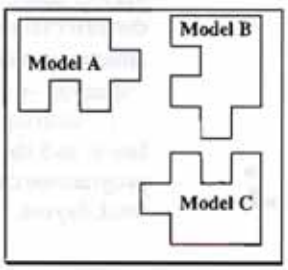
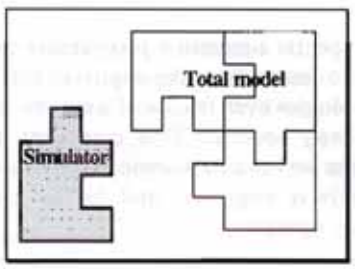
SMI™- Simulation Module Interface





⇒ Component Ware for Simulator Coupling

+ clear module and library structure for dynamic models
+ easy exchanging of models (within workgroups)
+ numerical correct computation of the total model
+ support for implicite models and discrete events
+ easy-to-use module coupling on a DLL basis
+ everybody can model with his simulator (generate modules)
+ everybody can simulate with his simulator (using modules)
+ models can be exchanged without source text (saving of investment and knowledge)
+ you get at least one second source for your simulator
+ currently available for Windows™ 95/NT
+ other simulation languages will follow (on demand)

Seite 1

Open Interface

Matrix-X ™

Matlab ™

ACSL ™

SIMUL_R ™

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SIMUTECH

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 pa ge. (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
19	-	-	-	-	-	-	-	1	1	1	3
Total	27	21	15	7	6	5	19	11	3	2	4

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 8 - PROSIMUL_R

PROSIMUL_R is a simulation language for continuous, discrete event and combined models. Models can be described graphically and/or in a textual manner. It has been introduced with Comparisons 1 to 7 and the Parallel Comparisons.

The main advantages are PROSIMUL_R's openness, flexibility and widespread capabilities.

a) Model Description

The model is described using 8 stations for (each) east- and westbound arriving, waiting, processing and one lock station. The 8th station is used to process a so-called "computational entity", which implements the controlling mechanisms (it waits for and collects demands of barges for changing the water level, and changes the level itselves). Therefore the model is near to reality – station 8 could be seen as a an electronic controller for example.

For modelling the barges arrivals CREATE_EVENT statements are used, a list of arrival times is specified. This allows for processing all comparison tasks without changes in the model, only specifying the times within the lists.

The eastbound and westbound stations can be implemented in one macro (invoked twice): Then the model DYNAMIC consists of about 56 PROSIMUL_R statements (including DO statements) + declarations and initializations, about 16 of the 56 statements are used for the model logistics of the Lock.

b) Validation with Deterministic Datasets

... delivers the expected results.

c) Statistics

The statistics for activities 1, 2, 4, 5 are shown in the Table below.

The basic statistics (mean of pooled throughput times) are computed by the WATCH macro of PROSIMUL_R, which gives the opportunity to compute statistical values at each place of a model, collecting data each time an entity reachs the WATCH statement – asynchronously to any time events.

Table

	Activities 1,2	Activities 4, 5
90 % Conf Int 1	436.0 ± 29.3	13.8 ± 53.2
90 % Conf Int 2	507.8 ± 40.1	133.1 ± 58.7
90 % Conf Int 3	512.9 ± 36.5	66.9 ± 71.7
Grand 90 % Conf Int	485.6 ± 20.8	62.0 ± 63.2

The differences show, how much different random number generators and initial values can influence results of probabilistic simulation runs!

As suggested in the description of the comparison we used Excel for statistics, based on the values computed from PROSIMUL_R. Nevertherless because of a powerful runtime environment it is not necessary to exchange data by hand or via ASCII files: PROSIMUL_R can directly access Excel table fields: e.g. the command (using Excel syntax)

```
IPC_POKE Excel | eurosim ! A2 = 'Text';
```

simply writes "Text" to field A2 of Excel. Embedded into the statistics loop within the interpreter, similar commands create all values needed in the Excel table.

Then another simple PROSIMUL_R command invokes the computation of confidence intervals in Excel. So we need not do anything in Excel - except extracting the results into this paper!

d) Comments

The model could be nearer to reality if we introduce length and queuing information for the barges. The throughput times then become a little bit larger (we would use ECONVEYOR_BUFFER macros to model this in PROSIMUL_R).

For information and comments please write, phone fax to

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Comparison 9 - SIMULINK

SIMULINK is the simulation *blockset* on top of MATLAB. It is a block-oriented simulation system with a graphical frontend. Models are composed using blocks with defined inputs and outputs, which are connected by lines. A rich set of standard blocks can be found in predefined libraries. Additionally *s-functions,* which are MATLAB interpreter scripts, can be used implement blocks of higher complexity.

Description: The model of the Two Tank System was built up by combining the MATLAB s-function *s_tank* (figure 2), which describes the tank dynamics, and the function *sffis* inside the block *Fuzzy-Controller.* The last function was build with the aid of the MATLAB *Fuzzy Toolbox*.

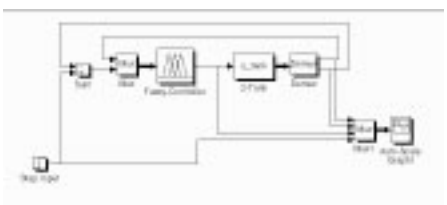

Fig. 1: SIMULINK Model

```
function [sys, x0] = s_tank(t,x,u,flag)
   ...
if abs(flag) == 1
% return xdot
    if x(2) < 16
      r2 = 1.2;
    else
      r2 = 1;
    end
x1dot=0.067*u-v1*0.06624*sqrt(abs(x(1)-
   -x(2)))*sign(x(1)-x(2));
x2dot=-r2*v2*0.0605*abs(x(2))^0.43+v1*0.06624*
   *sqrt(abs(x(1)-x(2)))*sign(x(1)-x(2));
sys = [x1dot, x2dot]
   ...
```

Fig. 2: s-function *s_tank*

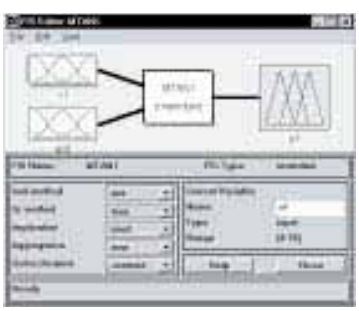

Fig. 3: FIS Editor

Results: Task a1) The Fuzzy Toolbox offers a *FIS Editor* (*Fuzzy Interference System Editor*, figure 3) where the user specifies the fuzzy system. The different methods for *And, Or Implication, Aggregation and Defuzzification* can be defined by selecting predefined methods as well as by choosing customized ones. Rules are defined in a *Rule Editor* where one can choose between different formats of description called *verbose*, *symbolic* or *indexed*. The definition of the membership function can also be done in a special editor. The result is a matrix, describing the different parameters and methods that has to be loaded into the model using the readfis command.

Task a2) The visualisation of the surface (figure 4) can be achieved directly within the *FIS Editor*. The corresponding computing time on a PC 80486 with 100 MHz was: ta_{fc1}= 21 seconds.

Task a3) The *Fuzzy Toolbox* does not support singletons, so this task is omitted. Direct programming in MATLAB would be possible but inconvenient.

Task b1) The result of the simulation run is shown in figure 5 (computing time tb_{fc1}=22 seconds).

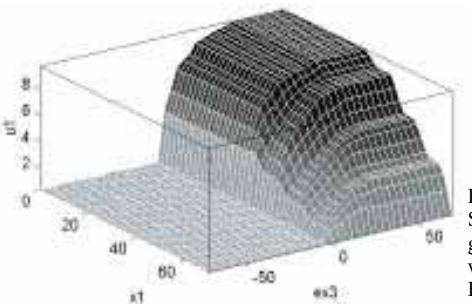

Fig. 4: Surface generated with the FIS Editor

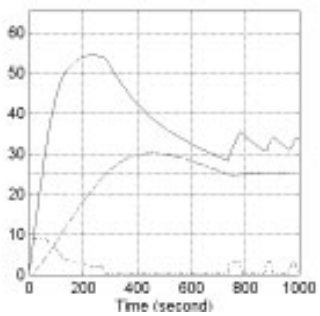

Fig. 5: Result of the run with FC1

Task b2) see Task a3)

Task c1) The *Fuzzy Toolbox* does not provide the necessary features for describing weighted rules.

Task c2) An outstanding feature of the *Fuzzy Toolbox* are the graphical capabilities of the *FIS Editor*. The *Rule Viewer* can display the whole fuzzy interference process based on the interference diagram. The *Surface Viewer* helps to visualise the output of the system versus any one or two inputs to the system. Furthermore, the system is capable of working either with *Mamdani* or *Sugeno-style* interferences. In addition to the polygonial shapes for defining membership functions used in this example a lot of continuous shapes for more specific applications are available. *ANFIS*, the *Adaptive Neuro Fuzzy Interference System,* enlarges the features of the toolbox to learning systems, tuned with a backpropagation algorithm.

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Comparison 10 - SIMFLEX/2

Description of SIMFLEX/2:

SIMFLEX/2 is an element oriented simulator for material flow systems and has been developed by the section Production Systems of the Department for Mechanical Engineering at the University of Kassel in Germany. The material flow systems are constructed out of a given set of standardized elements via a graphic user interface. A CAD-interface can be used to generate simulation modells directly out of existing plant layouts. The elements' function is influenced by means of technical and logical parameters. In addition to these parameters the user can generate his own steering programs via a user-programming-interface. Having started a simulation model, a graphic animation and a statistic registration system can be added. Thus the user is enabled to intervene in a running simulation. A special feature of SIMFLEX/2 is its real time interface for communication with Programmable Logic Controllers (PLC). Through this it is possible to use the simulator for controlling real plants.

Description of the model:

A submodel of a philosopher consists of the philosopher himself, his left hand and his right hand. He interacts with his left tray, his left philosopher, his right tray and his right philosopher. All elements are "machines" in the SIMFLEX/2 vocabulary.

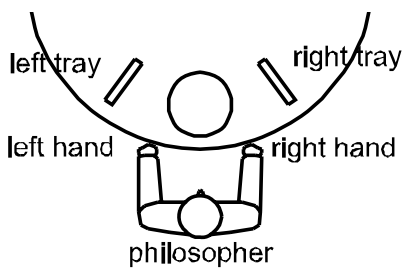

Figure 1: Submodel of a Philosopher

After a philosopher gets hungry, he looks for his left stick on his left tray. If the stick is available, the philosopher activates his left tray, and the stick will be transferred from the tray into his left hand. If the stick is in his left hand, he looks at the left hands of the other philosophers. If all philosophers hold a stick in their left hand, the deadlock is detected and the simulation is aborted. If there is no deadlock, the philosopher tries to get his right stick. In order to fulfill the defined strategy, every philosopher activates his left tray **instantly** and his right tray **after current**. Thus it is guaranteed, that a left philosopher gets the stick first in case of simultaneous access. By storing the access time, each philosopher is able to detect a simultaneous access.

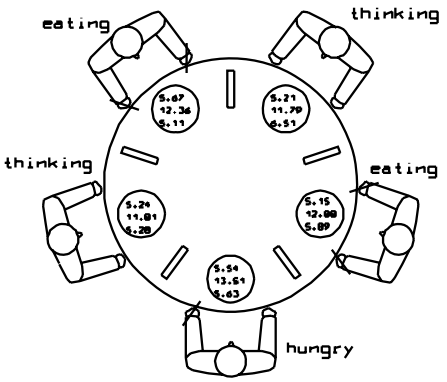

Figure 2: Simulation layout

Results:

A deadlock was detected after 1583278 min. (about 3 hours real time on a Pentium 100 under Windows 95) The table shows the results at the deadlock time.

	Thinking		Waiting		Eating	
	mean	stdev.	mean	sdev.	mean	stdev.
P1	5.5005	2.8720	11.7272	8.1549	5.5009	2.8720
P2	5.5006	2.8720	11.6829	8.1561	5.4992	2.8725
P3	5.5009	2.8720	11.6956	8.1849	5.4999	2.8723
P4	5.4999	2.8720	11.6798	8.1658	5.5020	2.8725
P5	5.5006	2.8719	11.6875	8.1600	5.5010	2.8721
All	5.5005	2.8720	11.6946	8.1643	5.5006	2.8723

The chopstick utilisation was: 92.11%, 92.10%, 92.07%, 92.08%, 92.11% and overall 92.09%.

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Comparison 10 - Create!

Create! is a simulation development environment aimed at building discrete event simulation systems. It is based on finite state machines combined with an object-oriented modelling and programming environment. Models are constructed within a graphical model editor and consist of elements and connections denoting the flow of objects (information, material) through the system. Communication between elements may be handshaked. This is done by using plugs, which really represent several connections (pins) at once.

Model description: The philosophers as well as the places for the chopsticks are represented by elements in the model. Although it is clearly not the fastest possible way to model the problem, this solution was chosen for demonstration purposes. Each philosopher is connected with the two chopstick places to his left and right (in figure 1 this is visualized by three circles (=pins) standing for a plug on either side). Picking up a chopstick is realized by sending a request to the chopstick place (middle pin) and then waiting for the chopstick to arrive (bottom pin). After having finished with eating, the acquired chopsticks are sent back to their places (top pin).

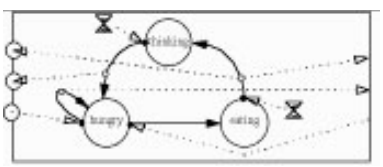

Figure 1: The philosopher's state machine

States are represented by circles with the state name in the middle, transitions between states as arrows. Signals are drawn as dashed arrows. The sand clock stands for delayed signals being sent by the scheduler. A philosopher initially is in the state thinking, which he leaves after a certain time when he gets hungry. He then first tries to grab the chopstick on his left. After having received this, he requests the one on his right and starts eating as soon as he has hold of both chopsticks. After having finished eating, he gives back the chopsticks and starts thinking again.

Results task i: The following table shows the results from a simulation run with a deadlock at 660000 time units:

	Thinking		Waiting		Eating	
	mean	stdev	mean	sdev	mean	stdev
P1	5.496	2.628	11.91	7.805	5.496	2.630
P2	5.510	2.631	11.98	7.715	5.494	2.628
P3	5.497	2.629	11.88	7.844	5.497	2.630
P4	5.502	2.633	11.87	7.823	5.493	2.629
P5	5.491	2.630	11.85	7.787	5.500	2.630

The chopstick places have to respond to the requests from the philosophers on the left and right side. On simultaneous access, the philosopher on the right has the higher priority. As (real time) simultaneous access is always mapped to sequential events in the simulated system, we have to defer the decision for whom to grant the chopstick, if the first request happens to come from the left philosopher. In Create! we do this by scheduling a signal with a zero delay, which is garantied to be processed later than a possible pending request signal from the right philosopher.

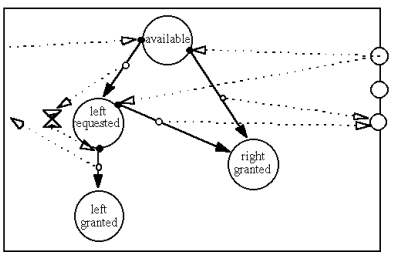

Figure 2: Handling simultaneous access

The state machine provides distinct states for requesting and granting for both sides. Having granted the chopstick for one side and receiving a request from the other, puts the state machine into the appropriate request state. When the chopstick is returned, it can immediatly be granted to the requested side.

On a simultaneous access with the first request coming from the left side, the state machine goes into the `left requested` state and schedules the zero delay signal for granting the chopstick. If a request from the right side happens at the same time (before the zero delay is over!), the chopstick is granted and the state set to `right granted`. When the delayed `left grant` arrives, the state machine is now either in the `right granted` state, which then sets the next state to `left requested`, or still in the `left requested` state, which leads to granting the chopstick to the left.

Results task ii: There are two ways to detect a deadlock in this model. One would be to build an extra element checking for the event of all philosophers being hungry at the same time. Within this solution we rather relied on the fact that within a deadlocked system no events remain in the event queue. By encountering an empty event queue the Create! simulation kernel aborts the simulation and logs the message

```
No more events at 660000
```

into the simulation transcript window. Deadlocks occurred between 220000 and 12000000 time units simulated time. The real time needed for the simulation runs was between 60 seconds and 50 minutes on a Sparc10 workstation.

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Comparison 10 - SLX

SLX is Wolverines Software Corporation next generation language. SLX builds on the strength of Wolverines GPSS/H and it provides powerful simulation capabilities in C-like language framework. SLX provides a multiplicity of layers. The layers ranging from the SLX-kernel at the bottom, through traditional simulation languages, e.g. GPSS/H, in the middle, to application specific language dialects and extensions at the top.

Model description: One of the SLX kernel features are objects. Objects can be used in two ways. Passive objects are used for modeling entities which have no executable behavior. Active objects have executable behavior patterns and they are roughly equivalent to GPSS/H transactions. All objects can have attributes and a number of standard properties.

The philosophers are represented by active objects. All philosopher objects are incarnations from the class philosopher. The class philosopher contains the following attributes:

```
class c_philosopher ( in integer number )
  {
   integer ident_nr; // philosophers number
   integer left_fork_number; // left fork
   integer right_fork_number; // right fork
   enum ( all_forks, left_fork ,
         without_forks ) behavior ;
   ...
```

The *initial* property is invoked when an object is created. All attributes for the philosopher object will be initiated.

```
initial {
  ident_nr = number ;
  left_fork_number  =  ident_nr ;
  right_fork_number = ( ident_nr + 1 ) % 5;
  behavior = without_forks ;
}  // end of initial
```

The *final* property is invoked when an object is about to be destroyed. The *report* property is invoked by the report statement. The *actions* property specifies the behavior pattern for an active object. It is invoked by the active statement.

The behavior of a philosopher is characterized by a loop of the partial activities thinking, eating and waiting for unused forks. The activities thinking and eating can be modeled by a scheduled time delay.

In SLX, state-conditioned delays are modeled by using *control* variables and the *wait until* statement. In the activity waiting for unused forks, the philosopher has
(1) to wait until his left fork is free and
(2) took the fork, after he has
(3) to look at other philosophers being in the waiting state and after he has
(4) to wait until his right fork is free and then
(5) he can take his right fork.

The activity will be divided into two state conditioned delays. The following statements defines a array of control variables. This array identifies the behavior of the 5 forks.

```
control boolean forks_busy [ 0.. 4] ;
```

The condition is easily expressed as a compound `wait until` condition. In SLX, `wait until` is the foundation of all form of state based events. The following statements show the modeling of wait until philosophers left fork is free and to took the fork.

```
/* wait until left fork free  */
wait until(not
      forks_busy[left_fork_number]);
/* take this fork  */
forks_busy[ left_fork_number ]  = TRUE;
```

When an active object will be activated, a *puck* is created for the object and placed on the active *puck* list. The *puck* is placed in a ready to execute state. *Pucks* are the schedulable entities in SLX. Scheduled time delays and state-based delays are *puck* based operations. Thus manipulation of *pucks* is the basic mechanism by which a collection of objects experiences events over time.

All waiting *pucks* are stored in reactivation lists. All pucks which can be executed are stored in the current event chain (CEC). The pucks are arranged in the CEC in order of decreasing priority. In case of same priority, pucks are sorted by FIFO strategy. If a state condition for an object is satisfied, the corresponding puck will be transfered from the reactivation chain into the CEC.

After taking the left fork, the philosopher has to look at other philosophers which could take a fork too. The pucks of this philosopher objects are stored in the CEC. So a puck of a philosopher taking his left fork has a higher priority then the puck of an philosopher taking the right fork.

Results task i) The results from a deadlock at time=40003 are shown in the following table.

	Thinking		Waiting		Eating	
	mean	stdev.	mean	sdev.	mean	stdev.
P1	5.51	2.93	11.58	8.05	5.51	2.93
P2	5.65	2.82	11.63	8.20	5.56	2.86
P3	5.42	2.87	11.60	7.98	5.60	2.87
P4	5.47	2.89	11.63	8.18	5.47	2.89
P5	5.48	2.84	11.56	8.09	5.48	2.83

Results task ii): An observer in the main procedure of the SLX-model detects a deadlock. 50 multiple simulation runs produce different time points for the deadlock. The minimum and maximum are: 35765 and 7751549.

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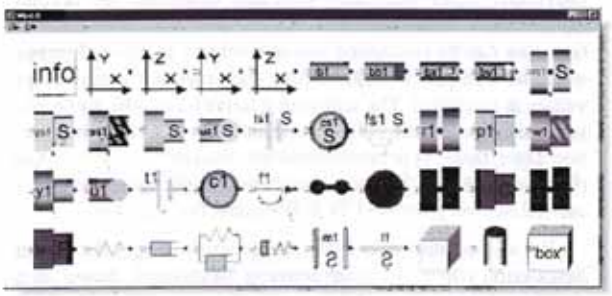
Dymola

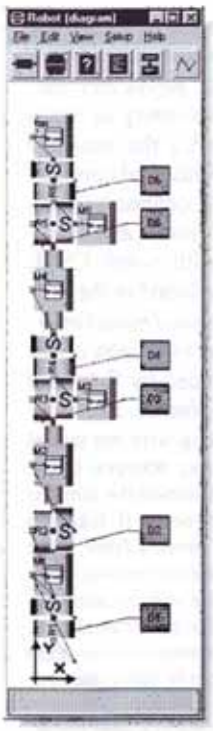
Dynamic Modeling Laboratory

for convenient model composition in physical terms
and efficient simulation by symbolic model manipulation



Model – Simulate – Animate

- Open library of reusable model classes: multibody-systems, electrical components, control blocks, drive trains, etc.
- Compose model graphically by dragging components from library
- Connect components according to physical coupling
- Double-click to open components for entering parameters like length and mass.
- Define experiment: simulation interval, initial conditions, etc.
- Simulate
- Animate dynamic results

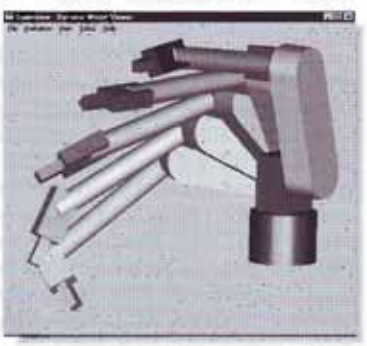


for multi domain modeling

Mechatronics · Mechanical · Drive trains
Electrical · Control systems · Thermodynamics
Aerodyramics · Switching devices
Hydraulics ...

for simulating complex systems

Robot optimization · Nuclear power plant
Hydraulic hammering unit · Biosphere 2 model
Bridge over Kiel channel · 12-cylinder engine
Lightweight robot · Biomechanical system
Thyristor control of DC motor
Automobile simulation ...



Object-oriented modeling

Dymola is an object-oriented language and a program for modeling of large systems. Models are hierarchically decomposed into submodels. Reuse of modeling knowledge is supported by use of libraries containing *model classes* and by use of *inheritance*. Connections between submodels are conveniently described by defining cuts which model physical coupling.

Equations

Model details are given by *ordinary differential equations* and *algebraic equations*. The user need *not* convert the equations to assignment statements. *Matrix equations* facilitate convenient modeling of 3D mechanical systems, control systems, etc.

Hybrid models

Discontinuous equations are properly handled by translation to discrete events as required by numerical integration routines. Dymola also supports *instantaneous equations* to model friction, impact and difference equations, etc. Dymola automatically generates the needed time and state events.

Symbolic model manipulation

Symbolic processing is used to make the simulation more efficient. Dymola converts the differential-algebraic system of equations symbolically to *state-space form* if possible, i.e. solves for the derivatives, or to reduced *DAE form*. Efficient graph-theoretical algorithms are used to determine which variable to solve for in each equation and to find *minimal systems of equations* (optionally using *tearing*) that have to be solved simultaneously (algebraic loops). The equations are then, if possible, solved symbolically. Linear systems of equations can be solved symbolically or numerically. Code is generated to handle the non-linear case iteratively. *Higher index DAEs*, typically obtained because of constraints between submodels, are handled by symbolically *differentiating* equations.

Dynasim

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Comparison of Parallel Simulation Techniques Multiprocessor System with Physically Distributed Memory / CPSS

CPSS (continuous parallel simulation system) is a prototype of a continuous dynamic system simulation tool on multiprocessor systems with physically distributed memory developed at the University of Magdeburg. The concept of CPSS includes the modular development of simulation models, splitting of complex models into several smaller submodels, connecting submodels, mapping them on processor nodes and simulating submodels simultaneously, with some CSSL standard features. CPSS has been developed in the programming language C based on the *extended model interconnection concept*. This concept is an extension of the model interconnection concept introduced by Schuster/ Breitenecker (mosis User's Guide, TU Vienna, 1994).

Basics: The problem when parallelizing with the model interconnection concept is the compromise between obtaining a good speed-up factor and the precision of the simulation results. The numerical inaccuracies occur if function values for the integration algorithm are needed from other submodels within the communication interval (between two communication points). These intermediate values cannot be exactly calculated. There are two ways for their calculation: using the function values from the last communication point (hold constant) or the intermediate values can be extra(inter)polated from the function values of e.g. the two last communication points (linear extra(inter)polation only with the available function values).

The goal of the extended model interconnection concept is to reduce the numerical inaccuracies when calculating the needed function values within a communication interval. Therefore the following is required:

- Three parameter values are sent at the communication point: function value y, the simulation time t at which this value is calculated and additionally the *first derivative* . The exchange of these parameters must be split into two communication instructions. First of all the function values and the simulation time had to be exchanged at the communication point. After this the right sides of the differential equations were evaluated to get the appropriate derivatives. Only now the first derivatives can be sent.
- The intermediate values can now be calculated from the available function values y and their first derivatives e.g. with the *Hermite interpolation algorithm*.

This concept was examined in CPSS for three explicit integration algorithms: Euler, Heun and RK4.

Hardware: Two available multiprocessor systems with physically distributed memory at University of Magdeburg were used as hardware platforms, GC/PowerPlus and the GCel 2/128 by Parsytec. GCel is a parallel system based on T805 transputers with PARIX operating system. The GC/PP also uses PARIX as the operating system (the same program development environment), but the hardware architecture is different. The GC/PP processor node architecture consists of two PowerPC-601 microprocessors and four T805 transputers. The speed-up factors for the three simulation examples explained in this article are results of the GCel 2/128.

Implementation: CPSS consists of two separate modules, the *command interpreter* and the *simulation kernel*. The interpreter (user interface) provides functions for textual inputs/outputs and graphical outputs (post run). The simulation runs can be controlled interactively by command inputs with the interpreter (e.g. setting and displaying parameter values at run time). The simulation kernel contains all necessary functions for the parallel simulation, e.g. several integration algorithms; synchronisation mechanisms for submodels (function library). The communication of the two modules is carried out via a defined TCP/IP connection (socket).

For a simulation study the user generates a specific model description file in the programming language C based on a developed parallel model structure (static partitioning and mapping). The model description file can contain several submodel definitions, each with their own specific model structure. Each submodel will be simulated on a defined processor node and can be connected to any other submodel via unidirectional links. At each communication point the parameter values are interchanged between corresponded submodels. The model description file has to be compiled and linked with the simulation kernel to an executable file. It can be run on the multiprocessor system.

Monte-Carlo study: In this example the 1000 simulation runs are distributed on available processor nodes. The simulation runs can be simulated simultaneously without communication between them, for that reason a good speed-up factor is expected. In order to solve the distribution problem the master-slave approach can be used in CPSS. The master-processor calculates the random numbers of the damping factor d and sends them to the slave-processors. Each slave-processor performs one simulation run with a specific damping factor d. If a slave-processor has finished one simulation run, it communicates with the master to receive a new damping factor d for the next simulation run. In Table 1 the obtained results (speed-up factors f) are presented for various numbers of slave-processors.

slave processor nodes	4	8	16
speed-up factor f	3.98	7.92	15.6

The 1000 simulation runs were executed in the time interval [0,2] with the step width h=0.002 and using RK4.

Coupled predator-prey population: Five populations are described in this predator-prey system, which are tightly coupled. For the parallelization of this system the five populations are distributed on two processor nodes, therefore one processor node calculates three and the other node simulates two populations (h = 0.01, communication interval cint=h=0.01, RK4). Such a distributed simulation did not bring any success. The simulation on two nodes was significantly slower than in the serial case (speed-up factor f = 0.3). This is due

to the disadvantageous relation between calculation and communication overhead (communication calculation). A further distribution of the five populations on three or five processor nodes would produce an even worse speed-up factor, because the communication overhead is even higher.

Partial differential equation / swinging rope: Figure 1 shows the solution of the swinging rope problem for two select lines x=9L/10 and x=L/10. The simulation run is executed with a discretization of N=800 lines using eight processor nodes (time interval [0, 30], h=0.005, cint=h=0.005, RK4). Thus every processor node has to calculate 100 lines. Only the adjacent parameter values of the neighbouring processor nodes have been interchanged at the communication points (weak coupled submodels). The resulting speed-up factor was f=5.21. The non-smoothed curves in Figure 1 present the inaccurate calculation of the needed function values within the communication interval. The intermediate values were held constant. The numerical inaccuracies increase further if the 800 lines are distributed on e.g. 16 processor nodes. Figure 2 shows the solution of the two selected lines with the extended model interconnection concept. The interpolation of the needed intermediate values has been carried out with the Hermite interpolation algorithm. The resulting speed-up factor was 4.96 (8 nodes). The additional exchange of the first derivative and their use at the calculation of the intermediate values proved to be advantageous. The extended model interconnection concept shows a well-balanced relation between obtaining a good speed-up factor and the precision of the simulation results.

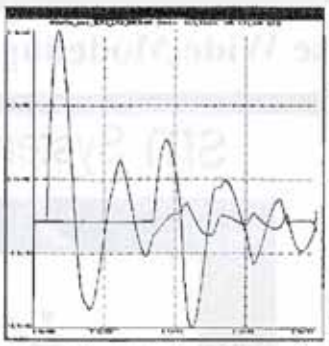

Figure 1: Swinging Rope; intermediate values were held constant

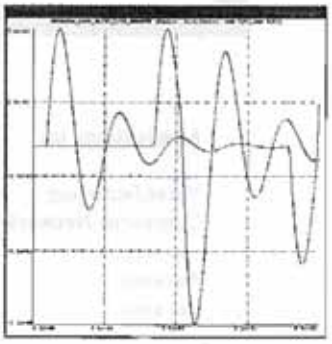

Figure 2: Swinging Rope; intermediate values were calculated with Hermite interpolation algorithm

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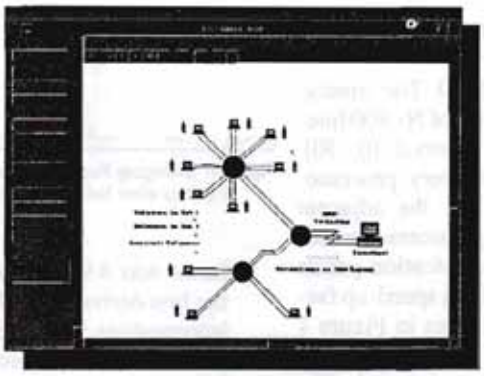

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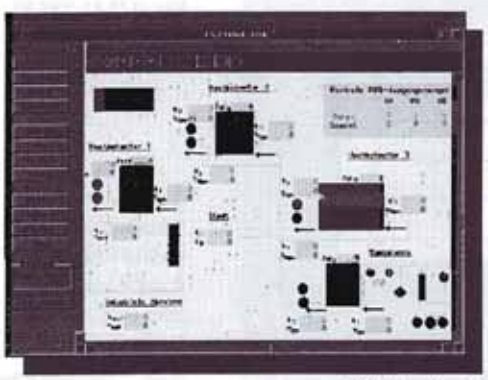

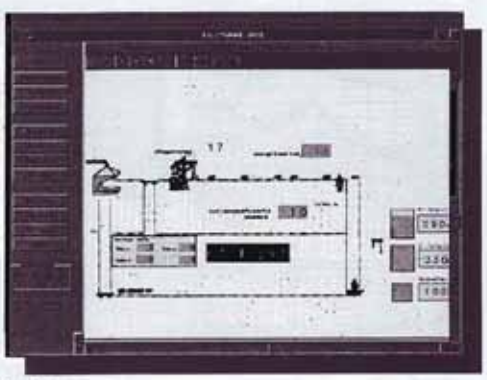

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Book Reviews

Modelling and Simulation
Sixth Bath International Fluid Power Workshop
Burrows C.R., Edge, K.A. (eds.)
Research Studies Press Ltd., Taunton 1994
ISBN 0-86380-162-5, 299 + xii pages

The University of Bath Fluid Power Centre regularly hosts the annual series of Bath International Fluid Power Workshops. The workshops concentrate on new developments and special topics in fluid power dynamics.

The sixth workshop in 1993 focused on research and development on the topic of modelling and simulation in fluid power. These Proceedings Volume contains 19 sections corresponding to the papers presented at the Workshop. The range of application contributions covers modelling and simulation of/for: electromagnetic characteristics of valves, high speed hydraulic motors, axial piston pumps, triple pumps control, human interaction with underwater breathing equipment, adaptive control of solenoid valve, controlling pneumatic servos, adaptive pressure regulation, control of hydraulic force actuators. Furthermore modelling methods and software tools are presented: SSP – a simulation program for pneumatics, BGSP – Bond graph simulation program knowledge-based programming for dynamic response of hydraulic systems, expert – simulation software package for electro- hydraulic control, fuzzy reasoning for stabilisation of control systems, adaptive control schemes, application of neural networks. The contributions show an interesting mixture between classical modelling and simulation in fluid power applications and the introduction of new methods in this area.

Innovations in Fluid Power
Seventh Bath Int. Fluid Power Workshop
Burrows C.R., Edge, K.A. (eds.)
Research Studies Press Ltd., Taunton 1995
ISBN 0-86380-170-6, 368 + xiv pages

This Seventh Bath International Fluid Power Workshop, held in 1994, concentrated on innovations in fluid power. These Proceedings consist of 23 contributed papers focusing on innovations concerning this topic. The editors arrange papers of similar content in eight sections which reflect innovative areas: neural networks, energy saving, simulation, features of controlling, pneumatics, noise, measurement and testing, pumps and transmissions. Although a separate section is devoted to simulation, modelling and simulation can be found also in the other sections. Again this workshop follows an interesting tradition, which gives insight into special aspects of the topics presented: in case of discussions subsequent to the presentation of the paper, the contributions to the discussions including the authors' responses are printed as addendum to the paper.

Design and Performance
Eighth Bath International Fluid Power Workshop
C.R. Burrows, K.A. Edge (eds.)
Research Studies Press Ltd., Taunton, 1996
ISSN 0-86380-187-0, 368 + xiv pages

These Proceedings of the Eighth Bath Fluid Power Workshop (held in September 1995 and concentrating on design and performance) contain the 23 contributions to this workshop. The editors have grouped them into six categories. In the first category *Control* we find three papers presenting control strategies for robots, vibrators and engines. The next category *Circuits and Components* concentrates mostly on modelling and simulation and also on the improvement of simulation tools. For example, the authors discuss the use of neural networks for modelling fluid power components. In order to be more cost-effective, they replace detailed mathematical models by "data-based" models. The success of this approach is shown in several examples. The papers in the category *Pumps* cover amongst other topics the generation of pressure pulsation and also noise reduction, an increasingly important matter in order to meet legislation requirements. Three papers are subsumed under *Simulation*. Two of them show different approaches and modelling techniques. The third presents a software package, DSHplus developed at the RWTH Aachen, Germany. In the fifth category *Pneumatics*, the papers cover very different topics: from pneumatic positioning systems to pneumatic servo systems. *Contamination and Materials*, the last category, discusses themes characterised by the request for higher efficiency and reliability. After a paper on wear particle code systems we find a contribution on the application of new materials for wear reduction, and finally a paper on effective contamination control is presented, involving artificial intelligence techniques.

The reader can find in all these Proceedings a large variety of new developments and approaches on a high standard which are mostly illustrated with powerful examples. Consequently, these Proceedings can be recommended not only to specialists in fluid power but also to modelling & simulation people.

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***Simulationsverfahren für zeiterweiterte Petri-Netze* (in German)**
Christian Kelling
SCS - Advances in Simulation, 1995
ISBN 1-56555-088-9, 176 pages

This book, a PhD thesis, with English abstract, is divided into two main parts. The first part deals with analysis of simulation outputs, the second part shows how to accelerate simulation experiments with Petri nets. At least these investigations are underlined by a model of a computer communication system.

The book gives a detailed theoretical and mathematical overview on the background of stochastic Petri nets together with timed transition extensions. Also a detailed introduction into statistics and probability theory is given. Furthermore variance estimation with confidence intervals and a few methods of time series analysis are explained, together with their connection to Petri nets. As conclusion of the first part a variance estimation using spectral analysis gives the best result in analysis of the simulation results. The results are used for "accelerating" models. Using the Petri net model on its own, the author shows how to get information concerning variance and structure out of the model. Developing accelerating techniques like reduction of variance and forcing repetitive simulation trials after reaching thresholds, the simulation time can be reduced significantly.

This book is well suited for advanced users and specialists of Petri nets and discrete simulation. A relatively deep theoretical background on Petri nets and probability theory is needed.

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***Informatik für Maschinenbauer* (in German)**
Kopacek P., Probst R., Zauner M.
Springer-Verlag, 1996
ISBN 3-211-82755-2, 307 + xi pages

The purpose of this publication is to make students of engineering and related studies familiar with the concepts of modern applied computer science. Originated from a lecture held at TU Vienna, the treatise provides basic knowledge with respect to various operating systems, hardware components and software tools.

The book contains ten chapters; First, a brief introduction to the basics and the history of computer science is given. The discussion of hardware units (such as CPU, RAM, disks, I/O, bus types etc.) is followed by an introduction of the operating systems DOS and UNIX. Chapters 4 and 5 present software engineering and several programming languages. After a profound presentation of data bases, Windows and the MS-Office package are explained. Chapter 9 illustrates the usage of local area networks and explains protocols and different topologies.

The book concludes with some particular remarks on various applications of computers in engineering science, e.g. robotics, graphics, automatisation and simulation. The book can be recommended as a good textbook for introductory courses in computer science with emphasis on mechanical engineering.

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Logic, Programming and Prolog. 2nd Edition
Ulf Nilsson and Jan Maluszynski
John Wiley & Sons, ISBN 0-471-95996-0

This book is based on lecture notes for an introductory logic programming course for third year undergraduate students. Therefore it is very comprehensive, both in its structure and in its formulation. It is very useful for students or persons who want to learn about logic programming or about Prolog, still it might be interesting for persons already accustomed with some of these fields, because the structure of the book is described very well in the preface, so less interesting chapters can easily be omitted. The book is divided into three parts (Foundation, Programming in Logic, Alternative Logic Programming Schemes), which all three could stand for their own.

Part I gives a solid introduction into logic in general, including notions like predicate logic, model- and proof-theory, language, interpretation, model, logical consequence, logical interference, soundness, completeness, and substitution, and into more specialized fields of logic needed for programming in logic such as definite programs, Herbrand interpretations, unification, SLD-resolution, and negation-as-finite-failure.

Part II is devoted to simple, but yet powerful, programming techniques in Prolog. No implementation-specific details are given, nor are real-sized or highly-optimized programs developed. But the basics needed to write good programs are explained elaborately, based on the principles of relations and of the declarative and the operative meaning of logic programs.

While part I and II contain only well established scientific results, emphasizing not the proofs of the theorems, but their meaning for writers of logic programs, part III gives a brief introduction to some extensions of the logic programming paradigm, which are still subject of active research, such as concurrent logic programming languages, synchronization of parallel processes, don't-care nondeterminism, equations, and constraints.

So this book gives both a solid foundation and an overview of the state-of-the-art, opening a wide field for interested readers by its extensive bibliography.

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Objektorientierte Modellierung mechatronischer Systeme am Beispiel geregelter Roboter
M. Otter
Fortschrittsberichte VDI, Reihe 20, Nr.147,
VDI-Verlag Düsseldorf, 1995
ISBN 3-18-314720-3 (in German)

This book (a PhD thesis) starts with a short overview on modelling in various disciplines and the presentation of DYMOLA, the simulator that serves as a basis for the developments in the next chapters. Furthermore, a roboter system is presented as an example for a system that has to be modelled with tools coming from different disciplines: the mechanical parts – with multi-body system tools; the electric motors and their control – with electrical engineering tools; the controllers of the joints – with control engineering tools. In the following chapters the author describes object-oriented (OO) modelling techniques, starting with basic concepts and basic algorithms and also state-dependent structural variable systems. Then the OO modelling of multi-body systems, of drives and of control systems follows. In each of these chapters the author gives a theoretical (mathematical/physical) background and also related case studies. Furthermore, he develops the corresponding tools in DYMOLA. These modelling techniques are finally applied to a model for a concrete robot system, with interesting experiments. The book concludes with a discussion of the presented methods and an outlook to the future. In addition, the reader can find several proofs and aspects connected with DAE systems, a description of DYMOLA and a summary of the developed class hierarchies.

This book gives a good documentation of the capabilities of OO modelling techniques and of the features of DYMOLA. It is shown in an understandable way how to build up models of mechatronic systems. The book can be highly recommend.

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Solid State Physics Simulations
The Consortium of Upper-Level Physics Sotware
John Wiley &Sons 1996
ISBN 0-471-54885-5

In the book series "The Consortium of Upper Level Physics Education", edited by John Wiley & Sons, a while ago the title "Solid State Physics Simulation" was published. The name already indicates that this part of the series is mainly concerned with computer simulations of physical effects and properties relevant to solid state physics. The programs run in the DOS mode on any PC. This fact, however, can be regarded – as far as user friendliness and graphics are concerned – as a minor drawback and cannot be considered as state-of-the-art. Nonetheless, the user interface is quite convenient and does its job, even if the appearance might seem a bit clumsy.

The book issued together with a diskette contains basically a chapter for each of the seven programs which cover several aspects of solid state physics (*Phonon Dispersion Curves and Density of States, Lattice Specific Heat of Solids, Electron States in a One-Dimensional Lattice, Energy Bands, Gaps, and Eigenfunctions in an Infinite Lattice*, *Free Motion of a Wave Packet in a One-Dimensional Lattice, Inhomogeneous Semiconductor Laboratory, LCAO Workbench*). I would like to mention, however, that in my regard too much emphasis is put on energy bands and wave functions and some of the programs seem to cover too similar subjects. This fact is even more evident, if one takes into account the programs in the other part of the series entitled "Modern Physics". Each chapter consist of three parts. In the first part the theoretical background of the physical phenomenon simulated in the program is described. What follows is a short description of the program and finally, several simulation examples are given. The treatment of the theory is well done and gives a good background. However, in my opinion at least, this section arises more expectations for the computer program than the actual features of the simulation can live up to. Performing the simulations the connection with the theory it is not always evident.

As an example I would like to mention two of the programs in more detail. In *Electron States in a One-Dimensional Lattice* we can observe the development of energy bands, as one progresses from single atoms to a simple solid. The influence of several parameters can be studied. For instance, the appearance of energy levels in forbidden zones as a result of defects can be visualized. By means of the *LCAO Workbench* we can obtain a first insight in the energy levels and physics of clusters.

In conclusion, the physics simulation course "The Consortium of Upper Level Physics Education: Solid State Physics Simulation" in spite of some justified critique proves to be a useful tool for undergraduate physics education in order to demonstrate several phenomena and quantities from solid state physics. A prior knowledge of the issues involved or a detailed study of the theory found in the book seems to be necessary before a useful "playing" with the simulations.

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Email: wohuiap@iap.tuwien.ac.at

Early Success of ACSL Optimize in Europe

Rapid Data Ltd is is recording very quick sales for ACSL Optimize, the successor to the Optimisation and Parameter Estimation software package SimuSolvTM. ACSL Optimize offers the latest in state-of-the-art technology, by using a graphical user interface on PC under Windows 3.1x, 95 and NT. It follows on the footsteps of the highly successful SimuSolv product which has been in use for several years by most of the European Chemical and Pharmaceutical companies such as BASF, Bayer, La Roche, Hoechst, Rhone-Poulenc, etc. Dr. A. Goucem, technical manager at Rapid Data commented: "This is the most exciting development I have seen in many years of ACSL, and it is certainly translating in terms of user response and early orders."

For more information about ACSL Optimize, please contact Rapid Data Ltd, Amelia House, Crescent Road, Worthing, West Sussex BN11 1RL, UK, Tel: +44 1903 821 266, Fax: +44 1903 820 762, Email: info@radata.demon.co.uk, Web: http://www.radata.demon.co.uk

Abstraction Software Releases Version 3.0 of Low Cost Network & Workflow Simulation Software

Abstraction Software has released *Prophesy* Version 3 – a low cost Windows based Network & Workflow Visual Simulation System capable of simulating computer networks and workflow systems involving requests, services, and queues.

Version 3 adds features at both ends of the usability spectrum. Now, in addition to new features in the standard *Prophesy* interface, Version 3 includes the *Prophesy Express* interface. The Express interface acts as a superwizard to enable even faster model construction by simplifying the model construction process. As users become proficient in simulation and begin to require more powerful features, they can move their models to the full-fledged *Prophesy* interface.

Prophesy Version 3 requires MS/Windows 3.1 or above, a 386, 486DX or Pentium, with a minimum of 4 Mb of memory and has a list price of $599 (plus S&H).

For more information visit http://www.abstraction.com/abstraction/. Abstraction Software, P.O. Box 26-0123, Highlands Ranch, CO 80126 USA, Tel: +1-800-237-4152, Email: prophesy@abstraction.com

Extend Now Supports Five Operating Systems

Imagine That, Inc. has taken full advantage of the superior speed of the PowerPC technology by releasing the native version of Extend and its affiliated libraries for the Power Macintosh. The addition of the Power Macintosh versions means Extend now supports five operating systems: Windows 3.1, Windows NT, Windows 95, Macintosh 68K, and Power Macintosh. And, all Extend files are cross-platform compatible.

The Extend family of simulation packages (Extend, Extend+BPR, and Extend+Manufacturing) are industrial strength, desktop tools for modeling scientific and engineering processes, and industrial operations. Extend empowers users with the ability to simulate and validate ideas to resolve "what if..." questions and assist in the decision making process.

For more information, contact Imagine That, Inc. at 6830 Via Del Oro, Suite 230, San Jose, CA 95119 USA; Tel: +1-408-365-0305, Fax: +1-408-629-1251, Email extend@imaginethatinc.com, Web site http://www.imaginethatinc.com/.

Computer Simulation for Education

Explore the world of Power Electronics and Drive Systems simulation using CASPOC. This educational package contains more than 90 examples of simulations of power electronics and drive systems. They come with a schematic of the circuit, components values, input listings, plots of the simulation results and questions and remarks about the example. An introduction paragraph "How To" explains the necessary commands for CASPOC. The majority of the examples works with the student version of CASPOC. Prices starting at U$ 375,-

Contact: Simulation Research, 2400 AJ Alphen aan den Rijn, P.O. Box 397, The Netherlands, Tel/Fax: +31 172492353.

dSPACE Systems for Chrysler

The American automotive company Chrysler, has standardized the development tool for its Advanced Engine Systems Development group on the dSPACE/The MathWorks Total Development Environment (TDE). Chrysler's management ordered 35 systems. Within the first project last year, the engineers realized the fine tuning of their existing engine control algorithms leading to significant time and cost savings.

The combination of the de facto software standard MATLAB/SIMULINK with dSPACE results in an environment that integrates all phases of the development process from analysis, modelling, design and real-time test. The Real Time Workshop (RTW) and the REAL Time Interface (RTI) generate code automatically under SIMULINK. TRACE enables real-time data cap-

ture and COCPIT offers visualisation and interaction with the experiment during time.

dSPACE's hardware is based on the Digital Signal Processors from Texas Instruments and can be enhanced with the newly released board based on the Alpha processor by DEC. In addition, a wide family of I/O boards enable customer specific configurations of the system.

Contact: dSPACE GmbH, Technologiepark 25, D-33100 Paderborn, Tel: +49-5251 16380, Fax: +49-5251 66529, Email: info@dspace.de

AutoSimulations acquires a Division of U.K.-based Integral Solutions Limited

AutoSimulations, Inc. announced the acquisition of the Integrated Scheduling System (ISS) Products Division of U.K.-based Integral Solutions Limited (ISL). Under the agreement, AutoSimulations will combine ist AutoSched simulation and scheduling product with ISS's integration , dispatching and reporting technology into what AutoSimulations calls the AutoSched product family. Prior to the acquisition, the full suite of products were installed at selected customer sites in Europe and in the United States.

The AutoSched product family has three major components: the Simulator (ASAP), the Real Time Dispatcher (RTD) and the ISS Reporter.

Contact: Karen Stanley, AutoSimulations, Inc., Tel: +1-801 298-1398 ext. 300 or Stephanie Miller, Tel +1-801 487-4800, Email: smiller@ppch.com

AutoSimulations releases Version 8.2 of AutoMod

AutoSimulations has announced the release of AutoMod 8.2, ist 3-D graphical simulation tool. This latest version combines power, flexibility and true 3-D graphics of AutoMod with more interactive functions and tools. AutoMod is now available for Windows 95 and Windows NT.

New features include direct IGES/Sim import and export (transfer of design files from various CAD systems). Additionally, Web tools for the PC version of AutoMod 8.2 put model output into html and graphics formats that can be built into a Web page, The model output can then be distributed via intranet/Internet.

Contact: Sandy Richards at tel: +1-801 298-1398 ext. 312 or by Email at sandy@autosim.com.

1st World Congress on Systems Simulation

(2nd Joint Conference of International Simulation Societies)

September 1-4, 1997, Singapore

Theme: Legacy for the 21st Century

The conferences are listed in two groups, F: "Foundations of Simulation" and A: "Applications of Simulation":

Foundations of Simulation:

F1. Simulation Methodology, Tools, and Environments
Bo-Hu Li (China), Wolfgang Borutzky (D) /
Ralph Huntsinger (USA), Helen Karatza (Greece)
F2. Simulation and Artificial Intelligence
Ming Lian Zhang (China) / Axel Lehmann (D)
F3. Machine Learning, Neural Nets, and Genetic Algorithms
Miroslav Snorek (CZ) / Mohamed Kamel (CDN)
F4. Optimization and Simulation
Helena Szczerbicka (D) / Istvan Molnar (H)
F5. Analytical and Numerical Modelling Techniques with Applications on Quality of Service Modelling
Gunter Bolch (D) / Hermann de Meer (D)
F6. Parallel and Distributed Simulation
Yong Meng Teo (SGP), Winfried Hahn (D) /
Garry Tan Soon Huat (SGP)
F7. Simulation by Means of Vector-, Parallel-, Neurol Computers, and Networked Workstations
Eugene Kerckhoffs (NL) / P.M.A. Sloot (NL)
F8. Super Computer Systems
Jürgen Halin (Switzerland) / Mohammad Obaidat (USA)
F9. Validation / Verification
Louis G. Birta (CDN) / Grant Sheng (CDN)
F10. Soft Factors in Modelling and Simulation
Johannes Krauth (D) / Ellen Walther-Klaus (D)

Applications of Simulation:

A1. Simulation in Design and Manufacturing
Henri Pierreval (F) / Bernd Schmidt (D)
A2. Simulators and Applications of Real Time Simulation
Jamie Olmos (USA), Jordan Chou (CDN) / Richard Zobel (UK), George T. Bereznai (CDN)
A3. Engineering Applications
R. Nielsen (USA) / M. Savastano (I), A. Bruzzone (I)
A4. Simulation in Intelligent Transport Systems
Sadao Takaba (J) / Adrian Tentner (USA)
A5. Building Simulation
Rik Van de Perre (B) / M.B. Ullah (SGP)
A6. Simulation in Biology, Medicine, and Ecology
Dietmar P.F. Möller (D) / Mitsuo Umezu (J)
A7. Simulation in Energy
Niels Houback (DK) / Kaj Juslin (FIN)
A8. Simulation in Telecommunications
Oryal Tanir (CDN) / Hamid Vakilzadian (USA)
A9. Mission Earth
Alfred Jones (USA) / Mark Clymer (USA)
A10. Digital Signal and Imaging Processing
Marwan Al-Akaidi (UK) / M. McCormick (UK)

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

Classes on Simulation

March 1997

11 ***MATLAB / Simulink.*** Seminar at TU Vienna, Austria
Contact: ARGESIM, TU Wien, Abt. Simulationstechnik, Wiedner Hauptstraße 8-10, A-1040 Wien, Tel: +43-1 58801 5374, Fax: +43-1 5056849, Email: argesim@argesim.tu-wien.ac.at

11-12 ***Simulation mit SIMULINK***. Munich, Germany.
Contact: BAUSCH-GALL GmbH, Wohlfartstr. 21b, D-80939 München, Tel: +49-89 3232625, Fax: +49-89 3231063, Email: 100564.302@compuserve.com

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

18-19 ***Einsatz von MATLAB in der Regelungstechnik***. Aachen, Germany.
Contact: Scientific Computers GmbH, Franzstr. 107-109, D-52064 Aachen, Tel: +49-241 47075-0, Fax: +49-241 44983, Email: info@scientific.de

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

24-26 **MODSIM Course**. Frankfurt, Germany
Contact: CACI Products Division

April 1997

7-9 *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 5874211, Email: Felix.Breitenecker@tuwien.ac.at

9-11 **MODSIM III Course**. Camberley, U.K.
Contact: CACI Products Division

10 ***MicroSaint - Fuzzy Logic in diskreter Simulation***.
Seminar at TU Vienna, Austria
Contact: ARGESIM, TU Wien, Abt. Simulationstechnik, Wiedner Hauptstraße 8-10, A-1040 Wien, Tel: +43-1 58801 5374, Fax: +43-1 5056849, Email: argesim@argesim.tu-wien.ac.at

14 ***Effektive Simulation von Schaltnetzteilen.***
Munich, Germany.
Contact: BAUSCH-GALL GmbH

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

15-16 ***Einsatz von SIMULINK in der Regelungstechnik***. Aachen, Germany.
Contact: Scientific Computers GmbH

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

22-24 **MODSIM III Course**. Paris, France
Contact: CACI Products Division

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

30-May 2
COMNET III Course. Camberley, U.K.
Contact: CACI Products Division

May 1997

6 ***GPSS/H - Gleichzeitigkeit von Ereignissen***. Seminar at TU Vienna, Austria
Contact: ARGESIM, TU Wien, Abt. Simulationstechnik, Wiedner Hauptstraße 8-10, A-1040 Wien, Tel: +43-1 58801 5374, Fax: +43-1 5056849, Email: argesim@argesim.tu-wien.ac.at

7-9 **SIMPROCESS Course**. Camberley, U.K.
Contact: CACI Products Division

13-15 **COMNET III Course**. Frankfurt, Germany
Contact: CACI Products Division

20-22 **SIMPROCESS Course**. Frankfurt, Germany
Contact: CACI Products Division

June 1997

2-6 **Mathematical Modeling and Digital Continuous Computer Simulation of Engineering and Scientific Systems** (Lecturers: Prof.Dr. Walter Karplus, PD Dr. H. Jürgen Halin), Zurich, Switzerland
Contact: H.J. Halin: Tel: +41-1-632 4608, Fax: +41-1-632 1166, Email: halin@iet.ethz.ch, WWW: http://www.lkt.iet.ethz.ch/lkt/Short-Course.html

3-4 ***Einsatz von MATLAB in der Regelungstechnik***. Aachen, Germany.
Contact: Scientific Computers GmbH

4-6 **MODSIM III Course**. Camberley, U.K.
Contact: CACI Products Division

17-18 ***MATLAB-Kurs***. Munich, Germany.
Contact: BAUSCH-GALL GmbH

17-18 ***Einsatz von SIMULINK in der Regelungstechnik***. Aachen, Germany.
Contact: Scientific Computers GmbH

17-19 **COMNET III Course**. Camberley, U.K.
Contact: CACI Products Division

24-25 ***Simulation mit SIMULINK***. Munich, Germany.
Contact: BAUSCH-GALL GmbH

25-27 **COMNET III Course**. Paris, France
Contact: CACI Products Division

July 1997

9-11 **SIMPROCESS Course**. Camberley, U.K.
Contact: CACI Products Division

August 1997

6-8 COMNET III Course. Camberley, U.K.
Contact: CACI Products Division

13-15 MODSIM III. Camberley, U.K.
Contact: CACI Products Division

September 1997

16-17 ***MATLAB-Kurs***. Munich, Germany.
Contact: BAUSCH-GALL GmbH

Calendar of Events

March 1997

23-26 **Modelling and Control in Biomedical Systems**. Warwick, UK
Contact: Karen Whines, The Institute of Measurement and Control, 87 Gower Street, GB-London WC1E 6AA, Tel.: +44 171 387 4949, Fax: +44 171 388 8431, Email: instmc-sec@ mailbox.ulcc.ac.uk

April 1997

6-10 **HPC '97.** High Performance Computing '97. Atlanta, Georgia
Contact: Prof.Dr. Djamshid Tavangarian, Universität Rostock, FB Informatik, Albert-Einsteinstr. 21, D-18056 Rostock, Tel.: +49-381 4983369, Fax: +49-381 4983426

6-10 **SMC 97.** 1997 Simulation MultiConference. Atlanta, Georgia
Contact: SCS - The Society for Computer Simulation, P.O. Box 17900, San Diego, CA 92177-7900 USA, Tel.: +1-619 277 3888, Fax: +1-619 277 3930, Email: info@scs.org, WWW: http://www.scs.org

16-18 **CEE 97.** Concurrent Engineering Europe' 97. Erlangen-Nuremberg, Germany
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

17-19 ***7. Ebernburger Gespräche.*** Joint Meeting of three ASIM Working Groups. Ebernburg, Germany
Contact: Prof.Dr. D.P.F. Möller, TU Clausthal Institut für Informatik, Erzstraße 1, Adresse2, 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

May 1997

13-15 **Virtual Reality World '97**. Stuttgart, Germany
Contact: M. Wapler, Fraunhofer-Institut für Produktionstechnik und Automatisierung, Nobelstr. 12, D-70659 Stuttgart, Fax: +49-711 970 1005, Email: wapler@ipa.fhg.de, WWW: http://www.ipa.fhg.de/vrw97/

20-22 **CIS 97.** Conference on Control of Industrial Systems. Belfort, France
Contact: Ecole Nationale d'Ingenieurs de Belfort Belfort Technopole, Bp 525, F-90016 Belfort Cedex, Tel.: +33 84 58 23 28, Fax: +33 84 58 23 30

June 1997

1-4 **ESM 97.** 11th European Simulation Multiconference. Istanbul, Turkey
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

5-6 **ASIM Workshop**. ***"Simulation von Verkehrssystemen"***. Ratingen, Germany
Contact: Karl Heinz Münch, SIEMENS AG Bereich VT WPA, Ackerstraße 22, D-38126 Braunschweig, Tel.: +49 531 226 2225, Fax: +49 531 226 4305, Email: Karl-Heinz.Muench@BWG5.ERL1.siemens.net

5-6 *7. Treffen der Arbeitsgruppe.* ***Werkzeuge für Simulation und Modellbildung in Umweltanwendungen.*** Oldenburg, Germany
Contact: Prof. Dr. Michael Sonnenschein, OFFIS Escherweg 2, D-26121 Oldenburg, Tel.: +49 441 9722241, Fax: +49 441 9722242, Email: Sonnenschein@OFFIS.uni-oldenburg.de, WWW: http://www.informatik.uni-rostock.de/FB/Praktik/Mosi/ak5/WS_7.html

6-7 **MOSIM'97**. *Systemes de Production et de Logistique*. Rouen, France
Contact: Mr. Itmi, MOSIM'97, PSI/LIR-INSA, BP-8, F-76131 Mont Saint Aignan, Tel.: +33 2 35 52 83 31, Fax: +33 2 35 52 83 32, Email: mosim@insa.rouen, WWW: http://www.insa-rouen.fr/com/mosim.html

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, Email: ferscha@ani.univie.ac.at, WWW: http://sokrates.ani.univie.ac.at/~ferscha/pads97/index.html

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/

25-26 **TRANSCOM '97.** 2nd European Conference of Young Research and Science Workers in Transport and Telecomunications. Zilina, Slovenia
Contact: Ing. Helena Vrablova, Zilinska univerzita, Moyzesova 20, SLO-01026 Zilina, Tel.: +42 89 622723, Fax: +42 89 47702

July 1997

7-11 **11th ACM International Conference on Supercomputing**. Vienna, Austria
Contact: Dr. Steve Wallach, HP Convex 3000 Waterview Parkway, P.O. Box 833851 MS ADM, USA-Richardson, TX 75083-3851Tel.: +1-972-497-4250, Fax: +1-972-497-4441, Email: wallach@convex.hp.com, WWW: http://www.par.univie.ac.at/~ics97/

13-17 **SCSC '97.** The 1997 Summer Computer Simulation Conference. Arlington, Virginia, USA
Contact: SCS - The Society for Computer Simulation, P.O. Box 17900, San Diego, CA 92177-7900 USA, Tel.: +1-619 277 3888, Fax: +1-619 277 3930, Email: scsc97@scs.org, WWW: http://www.scs.org

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, Suite 101, CDN-Calgary, Alberta, T3B 0M6, Tel.: +1-403 288 1195, Fax: +1-403 247 6851, Email: iasted@istd.cuug.ab.ca, WWW: http://www.iasted.com/

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, Suite 101, CDN-Calgary, Alberta, T3B 0M6, Tel.: +1-403 288 1195, Fax: +1-403 247 6851, Email: iasted@istd.cuug.ab.ca, WWW: http://www.iasted.com/

24-29 **IMACS WC'97.** 15th IMACS World Congress. Berlin, Germany
Contact: Congress Office IMACS WC'97, GMD FIRST, Rudower Chaussee 5, D-12489 Berlin, Tel.: +49-30 6392 1800, Fax: +49-30 6392 1805, Email: imacs97@first.gmd.de, WWW. http://www.first.gmd.de/imacs97/

28-31 **International Conference on Deterministic and Stochastic Modelling of Biointeraction**. Sofia, Bulgaria
Contact: Dr. Tanya Kostova, Institute of Mathematics, Bulgarian Academy of Sciences, Acad. G. Bonchev str., Bl. 8, BG-1113 Sofia, Fax: +3592-971 36 49, Email: destobio@ iscbg.acad.bg, WWW: http://www.math.acad.bg/special/ destobio.html

September 1997

1-4 **WCSS'97.** 1st World Congress on System Simulation. Singapore
Contact: Doris Yee, 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

8-2 **PaCT-97.** Parallel Computing Technologies, Fourth International Conference. Yaroslavl,Russia
Contact: Supercomputer Software Department Computing Center, Lavrentiev pr., 6, RUS-63 00 90 NovosibirskTel.: (+7) 3832 350 994, Fax: (+7) 3832 324 259, Email: malysh@ssd.sscc.ru, WWW: http://ssd.sscc.ru/pact97/

8-11 **14th ITG/GI Conference Architecture of Computer Systems 1997.** Rostock, Germany
Contact: Prof.Dr. Djamshid Tavangarian, Universität Rostock, FB Informatik, Albert-Einsteinstr. 21, D-18056 Rostock, Tel.: +49-381 4983369, Fax: +49-381 4983

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

17-19 **6th IFAC Symposium on Automated Systems Based on Human Skill.** Kranjska gora, Slovenia
Contact: J. Cerenetic, J. Stefan Institute, Jamova 39, POB 3000, SLO-1001 Ljubljana, Tel.: +386 61 177 3759, Fax: +386 61 219 385, Email: janko.cernetic@ijs.si

EUROSIM - Simulation News Europe

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

Editors: *F. Breitenecker, I. Husinsky*
ARGE Simulation News

Layout: I. Husinsky

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17-19 **MMB'97.** *Messung, Modellierung und Bewertung von Rechen- und Kommunikationssystemen*. Freiberg, Germany
Contact: Tagungsbüro MMB'97, TU Bergakademie Freiberg, Institut für Informatik, Berhard-von-Kotta-Str. 1, D-09596 Freiberg, Tel.: +49-3731 39-3334, Fax: +49-3731 39-2645, Email: mmb97@informatik.tu-freiberg.de, WWW: http://www.tu-freiberg.de/mmb97.html

22-24 **21st Century Vehicle.** 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

October 1997

8-9 **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

19-23 **ESS 97.** European Simulation Symposium . Passau, Germany
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

November 1997

11-14 **ASIM 97.** *11. Symposium Simulationstechnik*. Dortmund
Contact: Dipl.Inform. Sigrid 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

12-14 **S + V.** Trade Fair for Simulation and Visualization. Dortmund, Germany
Contact: Dipl.Inform. Sigrid 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

December 1997

7-10 **WSC '97.** 1997 Winter Simulation Conference. Atlanta, GA
Contact: Barry L. Nelson, Northwestern University, Dept. Industrial Engineering and Management Sciences, 2225 N. Campus Drive, Evanston IL 60208-3119 USA, Tel.: +1-847 491 3747, Fax: +1-847 491 8005, Email: nelsonb@random.iems.nwu.edu, WWW: http://www.wintersim.org

8-11 **MODSIM 97.** International Congress on Modelling and Simulation. Hobart, Tasmania
Contact: MODSIM 97 Congress Secretariat, attn. Dr. A. David McDonald, c/- CSIRO Marine Laboratories, PO Box 1538, AUS-Hobart Tasmania 7001, Tel.: +613-6232-5482, Fax: +613-6232-5000, Email: MODSIM97@ml.csiro.au, WWW: http://www.ml.csiro.au/modsim97

February 1998

18-19 **17th IASTED.** International Conference on Modelling, Identification and Control. Grindelwald, Switzerland
Contact: IASTED Secretariat 4500-16 Ave. N.W., Unit 80, CDN-Calgary, Alberta, T3B 0M6Tel.: +1-403 288 1195, Fax: +1-403 247 6851, Email: iasted@istd.cuug.ab.ca, WWW: http://www.iasted.com/

April 1998

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

ARGESIM

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

In detail, ARGESIM organises and performs:

- Publication of the journal **EUROSIM - Simulation News Europe (SNE)**,
- Production of SNE, distribution service for EUROSIM societies and individual subscription service,
- Publication and production of the Book Series **ARGESIM Reports** and (together with ASIM) of the Series ***Fortschrittsberichte Simulation***,
- Comparison and evaluation of simulation tools (**EUROSIM Comparisons** on Simulation Software and Parallel Simulation Techniques),
- Support of EUROSIM and ASIM administration,
- Running a WWW-Server on activities of EUROSIM and EUROSIM members, on ARGESIM and ASIM activities,
  `http://argesim.tuwien.ac.at/`
- Running a FTP-Server with software demos of simulation software, engineering software tools and tools developed within ARGESIM projects,
  `ftp://argesim.tuwien.ac.at/`
- Organisation of seminars and courses on modelling and simulation, e. g. within EU programs or in co-operation with the McLeod Institute of Simulation Science (**MISS**),
- Organisation of "*Seminare über Modellbildung und Simulation*" at Vienna University of Technology,
- Support and Maintenance of Simulation Software at Vienna University of Technology,
- Development of simulation software (freeware) within projects, e. g. *mosis* - continuous parallel simulation and D_SIM - discrete simulation with Petri Nets.

Development of the simulator mosis: mosis - the modular simulation system - is a highly sophisticated simulation tool for continuous and mixed systems which can be used on a wide range of systems. Although originally created for parallel simulation, it can also be used on a single PC or workstation using the same model description and experimentation commands. As mosis is a compiling system on a "C"-basis, the produced executables run very fast. mosis is expandable with modules of any kind and is distributed as freeware (except C compiler).

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Information, Orders

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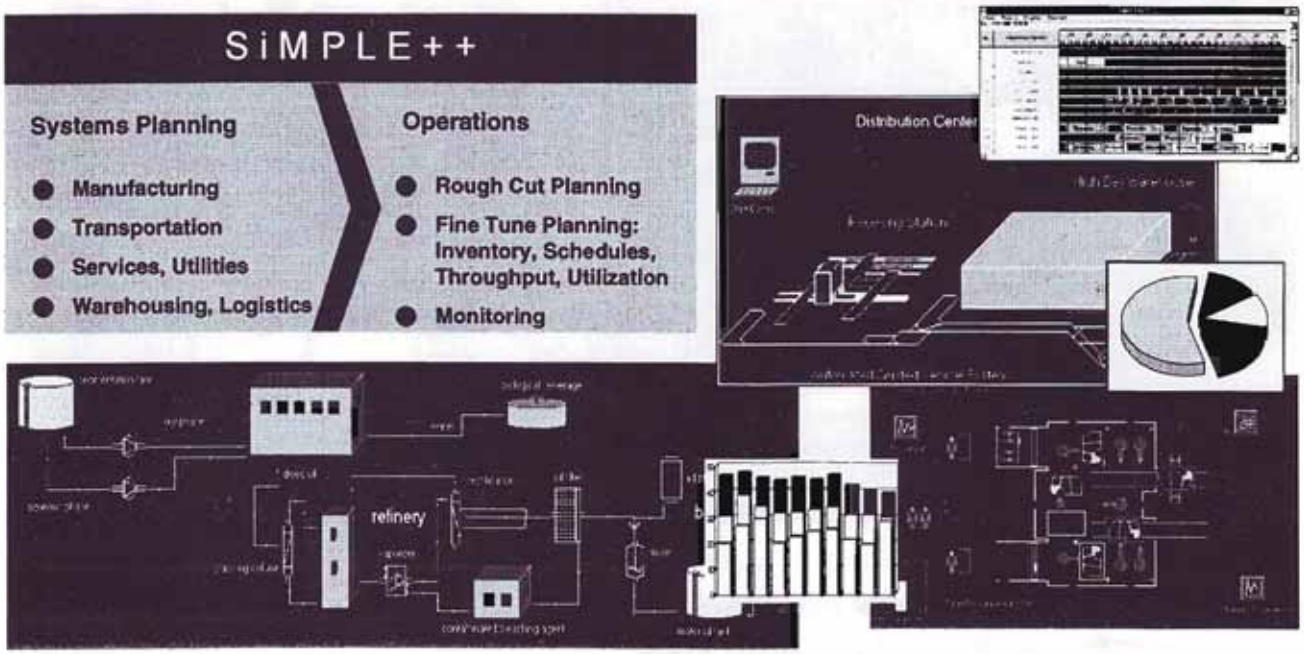
Applications



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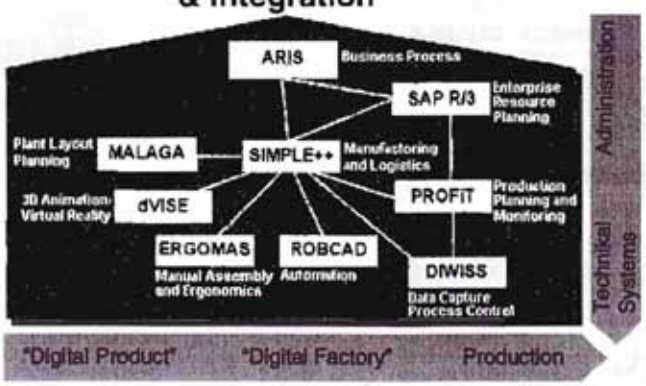

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