

**Second LAAS International Conference on**

# **COMPUTER SIMULATION**

**Faculty of Engineering and Architecture  
American University of Beirut  
Beirut, Lebanon**

**September 1-4, 1997**

**Organized by**

**The Lebanese Association for the  
Advancement of Science (LAAS)**

**Sponsored by**

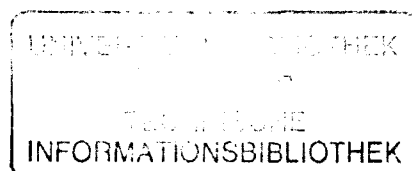
**The Lebanese National Council  
for Scientific Research**

**and**

**The Order of Engineers, Beirut**

**in Co-operation with**

**The Faculty of Engineering and Architecture  
American University of Beirut**



## TABLE OF CONTENTS

Page      Authors

### **Keynote Speakers**

Design Verification: How do we know that these 100-million transistor chips will work?	1	K.A. Sakallah
Utilizing the WEB in Developing and Teaching Simulation Methods.	4	I.N. Hajj
Telecommunications Planning: Strategy and Technology Issues.	7	P. Doany
Computer Aided Simulation in Oil Exploration and Production.	27	P. Coveney
Virtual Factory in the Multimedia Era.	35	H. Fujimoto
A Distributed Simulation Architecture for Intelligent Transportation Systems Evaluation and Operation.	42	H.S.Mahmassani

### **Session 1: Simulation Methodologies**

Toward a General OO Simulator for the Mobile Computing.	65	H. Khan K. Al-Tawil
Object Oriented Modelling with Viewpoints.	73	H. Naja
Using Artificial Intelligence for Cognitive Simulation.	81	A. Borgi S. El-Kassar

### **Session 2: Intelligent Simulation Environments I**

Evaluation and Simulation of on Chip Learning Analog Neural Networks.	91	H. Chible M. Valle G. Marco Bo D.D. Caviglia
Single Event Upsets Simulations on Neural Networks: A Case Study.	99	A. Assoum R. Velazco H. Ziade
On the Analysis of Artificial Logic Neural Networks.	107	A. Haidar M. Morisue

### **Session 3: Computer Performance**

A New Deterministic Technique for Multiprocessor Scheduling.	117	G.Nasr B.N. Moujabber
Mapping Data to Multi-computers using Tabu Search.	123	K.Diyab N. Mansour
Distributed Resource Performance Simulation.	129	T.Theoharis A. Abdallah

### **Session 4: Power Electronics**

A Universal Computer Control of ac/dc Converters.	137	I. Mougharbel A. Hajjar G. Roy
Computer Simulation and Design of Optoelectronic Devices.	144	H.M. Menkara B.K. Wagner R.G. Benz II C.J. Summers
Design Procedure and Experimental Results for the zvs dc-to-ac Converter.	151	A. Kayyali H. Khan Batarseh

### **Session 5: Intelligent Simulation Environments II**

Proposal of Evolution Algorithm for Fuzzy Petri Net.	159	I. Jarkass M. Rombaut
Extracting the Fuzzy Membership Functions for the Fuel Consumption in Dry Rotary Cement Kiln Using Genetic Algorithms.	164	M. Tayel M. Risk H. Abdelkader
Coordination and Fuzzy Control of Planar Robots.	170	G. Gautier C. Nerguizian M. Saad

## **Session 6: Circuit Simulation I**

Implantable Electrical Simulator Design Using Various Synthesis Tools.	179	M. Sawan S. Robin
Verification of Synthesised Designs through VHDL Simulation.	184	H. Harmanani
Design and Simulation of High-Performance Building Blocks Using Analog Artist From Cadence.	192	A. Assi M. Sawan

## **Session 7: Communications I**

Implementation of an All-Digital CAP Transceiver.	201	H.K. Liu F. Etemadi G. Lu N. Bagherzadeh F. Kurdahi,
A Simulation Environment for Concurrent and Real-time Switching Systems.	209	K.S. Park B.S. Lee

## **Session 8: Circuit Simulation II**

Modelling of Self Diffusion in Quantum Wells and Superlattices Based on III-V Hetero-structures.	217	C. Francis
Concurrent Bisimulations in Hidden Labelled Rewriting Logic.	223	M. Bettaz M. Maouche K. Barkaoui
Waveform Calculus for Timing Analysis of Digital Circuits.	231	J. Whittemore K. Sakallah

## **Session 9: Power Systems**

Practical Considerations when Calculating the Marginal Outage Cost.	239	R. Ghajar R. Billinton
Probabilistic Power Production Simulation with an Environmental Emissions Model.	245	S. Karaki F. Chaaban K. Tarhini

### Session 10: Circuit Simulation III

Fast Algorithm for Determination of Maximum Amplitude Zero-Input Limit Cycles in Recursive Fixed-Point Digital Filters.	255	A. Djebbari J.M. Rouvaen
Optimum Circuit Performance Using Volterra Series.	261	M.C.E. Yagoub H. Baudrand J. Boucher

### Session 11: Communications II

Using SPICE in Microwave Electromagnetic Simulation.	269	I. Casian-Botez H. Baudrand
Ray-tracing Computer Simulations for DECT Systems.	275	A. Salloum
Examples of Modelling of Electromagnetic Fields for the Conception or Improvement of a Microwave Applicator.	283	A. Elrafhi A. Rhattoy A. Alkarmo M.Audhuy-Peaudecerf S. Lefeuvre
Performance Analysis of ISDN Access Subsystem in Advanced Communication Processing Systems.	290	K.S. Kim
Visual Design, Simulation and Animation of Networks of Communicating Systems Using <i>VisualNets</i>	298	A. Abdallah

### Session 12: General Applications I

The Use of Transmission Line Matrix Method in Acoustics.	309	S. El-Masri P. Saguet X. Pelorson J. Simon
Simulation of Processes in the Single Photon Detectors.	316	V. Apanasovich V. Lootkovski V. Skakun
Modelling and Visualisation of Nuclear Collisions.	322	M. Farine

Cognitive Modelling and Filtering Interface for Visually Handicapped People.	327	Y. Monsef M.A. Nachi M. Ferdi
Analytic Model for Checkpointing and Rollback Recovery Database System.	333	M. El-Hakim M. Atoui

### **Session 13: Intelligent Simulation Environments III**

AI in System Theory, An Observability View.	347	D.A. Maluf
Simulation with Variability.	355	S. Nassif
Using Neural Networks to Model Magnetic Experimental Data Obtained by Using the Torque Magnetometer Technique on Chromium Thin-Films.	364	H. Hejase A. Hejase

### **Session 14: Biomedical Engineering**

Implications and Relationships in Medical Databases.	373	D.A. Maluf J. Liu
Low Power Simulation Methodology of Integrated Circuits for Cardiac Pacing Applications.	381	A. Mougharbel
Water and Heat Transport in the Human Trachea.	388	K.F. AbuGhali J. Faouke

### **Session 15: Manufacturing**

A Genetic Planner to Support DFA Product Assemblability Evaluation.	395	M. Sebaaly H. Fujimoto
An Integrated Intelligent Planning approach for Production Planning in the Building Product Industry.	404	N.N. Dawood
<i>ALOSURF</i> for Maintenance Integration in Manufacturing Systems.	411	C. Sassine Z. Simeu-Abazi

## **Session 16: Heat Transfer and Mechanical Systems I**

Numerical Study of Free Convection Loop Placed in Transverse Magnetic Field.	421	N. Ghadar
Computer Simulation of a Solar Powered Air-Conditioning System in Lebanon.	429	H. Al-Subhi O.C. Jadayel
Local Corrections Methods for Unsteady Vortical Flows Around Lifting Surfaces.	434	F. Hauville S. Huberson O. Knio

## **Session 17: Machine Vision and Image Processing**

Image Tracking for Inspection and Control in Textile Web Processing.	443	T. King L. Tao P. Witty S.S. Koh
Simulation and Implementation of Discrete Cosine Transform for Image Compression Applications.	451	A. Kassem A. Kaysi J. Davidson J. Houle M. Mansour
Computer Simulation of Yeast Cultivation Process.	455	V. Mitev
An Efficient Exact Euclidean Distance Transform.	461	M. Seaidoun J.M. Gauch

## **Session 18: General Applications II**

Non-Archimedean Structures as Differentiation Tools.	471	K. Shamseddine M. Berz
Analysis of Algorithms for Clustering Documents in Databases.	481	I. Moghrabi R. Makhoulian M. Safar
Minimising the RCS of a Cubic Object Using Bevensee Technique.	489	D. Fakhreddine M. Helier F. Jouvie W. Tabbara

Modelling and Control of the Pro-Art France Driving Assistance System.	495	A. Alloum A. Charara M. Rombaut
--	-----	---------------------------------------

### **Session 19: Engineering Management I**

The Development of Stochastic Simulation Models for the Running Cost of Traditional Construction Projects.	505	A.P. Kaka
An Effective Multiple Criteria Decision Analysis Maintenance Model.	513	A. Labib G. Williams R. O'Connor

### **Session 20: Civil Engineering Systems**

Simulation of an Aggregate Production Operations Using CRUISER.	523	D. Hajjar S. Abou Rizk
A CADD Application for One-Way Ribbed Concrete Floors.	531	M. Chahine M. Mabsout
Development of Traffic Simulation Model of Drivers Lane Changing Behaviour at Roadworks.	539	S. Yousif

### **Session 21: Heat Transfer and Mechanical Systems II**

Numerical Simulation of Cavitation Dynamics.	551	G.Chahine
An Adaptive-Stencil Very High Resolution Scheme.	560	M. Darwish F. Moukalled
Influence of Anisotropy of Far Field Stresses in the Numerical Modelling of a Deep Borehole Excavation.	568	N. El-Hassan J. Desrues R. Chambon
Modelling of Building Materials Subject to Thermal-Hygro-mechanical Couplings.	573	W. Obeid G. Mounajed



## **Session 22: Engineering Management II**

Event Driven Behavioural Simulation.	583	R. Shafi C.R. Carlson
Activity Relationships in Simulation Modelling.	591	N.N. Chehayeb
<b>Authors Index.</b>	<b>599</b>	