Program and Schedule

2008 Grand Challenges in Modeling & Simulation

Part of Summer Simulation Multiconfernce 2008

Conference Agenda

General Chair: *Dr. Ralph Huntsinger*
California State Universality – Chico, USA

General Program Chair: *Mr, Terry Ericsen*
Office of Naval Research, USA

Program Co-Chairs: *Dr. Roy Crosbie*
California State University – Chico, USA

Dr. Mhamed Itmi
INSA-ROUEN, France

Dr. Hamid Vakilzadian
University of Nebraska-Lincoln, USA

Monday, June 16, 2008

Theater B
8:30 am to 10:00 am
SPECTS/SCSC Opening Session and Keynote speech

Quality of experience: the route to scalable performance evaluation of networked systems

Speaker: Prof. Jonathan Pitts
Queen Mary, University of London, UK.

10:00 am to 10:30 am
Break

Theater B
10:30 to 12:00
SPECTS2008/SummerSim2008 Keynote Speaker II

Speaker: Prof. Rob Pooley
Heriot-Watt University, Edinburgh, UK

12:00 to 1:30 pm
Lunch Break

1. Theatre rooms A, B, C are in David Hume Tower building.
2. Rooms G01, G02, G03, G04, Theater 8, and Seminar rooms 8, 9, 10, 11 are in William Robertson Building.

1:30 pm to 3:00 PM
SCS/SISO Joint Plenary Session

3:00 pm to 30:30 pm
Break

6:00 pm to 8:00 PM
Reception

Tuesday, June 17, 2008

ROOM: Theatre 8
8:30 am to 10:00 am
GC Opening Session and keynote speech
Speaker: *Dr. Francois Cellier*
Quantized State System Simulation
Institute of Computational Science
ETH Zürich, Switzerland

ROOM: Seminar 11
8:00 am -10:00 am
Sessions T31: Joint Session of Grand Challenges and Aerospace/ Space
Session Co-Chairs: *Terry Ericsen, Office of Naval Research, USA*
Priscilla Elfrey, NASA, USA
10:00 am to 10:30 am
BREAK

ROOM: Theatre 8
10:30 am to Noon

SESSION T12: **Methodologies in Modeling Tools**
Session Chair: Ralph Huntsinger
California State University – Chico, USA

REALIZATION OF THE DEVS FORMALISM IN MATLAB/SIMULINK
Kyung Min Seo, Chang Ho Sung and Tag Gon Kim

ON THE STABILITY OF BI-RATE LINEAR SYSTEMS USING TRAPEZOIDAL INTEGRATION
Richard Bednar and Roy Crosbie

LATENCY-INSERTION METHOD AS A WAY TO INCREASE STABILITY AND SPEED OF CO-SIMULATION
Andrew Heilman and Antonello Monti

THERMAL-MECHANICAL DAMAGE PREDICTION TOOLKIT FOR COMPOSITE STRUCTURES SUBJECTED TO FIRE
Jim Lua, Jay Shi, Paul DesJardin and Scott Case

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ROOM: Seminar 9
10:30 am to Noon
SESSION T22: VTB PRO USER WORKSHOP
Session Chair: Roger Dougal
University of South Carolina, USA
Antonello Monti
Blake Langland
Earnie Broughton
University of South Carolina

Room: Seminar 11
Sessions T32: Joint Session of Grand Challenges and Aerospace/ Space
Session Co-Chairs*: Terry Ericsen, Office of Naval Research, USA*
Priscilla Elfrey, NASA, USA

12:00 to 1:30 pm
Lunch Break

ROOM: Theatre 8
1:30 pm to 3:00 pm
SESSION T13: Information Technology and Architectures
Session Chair: Dr. Francois Cellier
Institute of Computational Science, ETH Zürich, Switzerland

COMPARISON OF POLYNOMIAL AND NEURAL NETWORK MODELS FOR INFORMATION EXTRACTION FROM A DATA BASE OF MEASUREMENTS
Andrea Lorenz and Martin Kozek

Common Information Model for Sensors
Vinoth Mohan, Noel Schulz and Anurag Srivastava

FURTHER RESEARCH AND APPLICATION OF COSIM (COLLABORATIVE SIMULATION) GRID
LI Bo Hu, CHAI Xudong, HOU Baocun, MU Suchuan and SHEN Qingfeng

The RC6 Encryption Algorithm: A Combined Hardware/Software Implementation in SystemC
Robert Schmit and Hamid Vakilzadian

ROOM: Seminar 9
1:30 pm to 3:00 pm
SESSION T23: Tutorial on VTB
Speaker: Dr. Roger Dougal
University of South Carolina, USA
Antonello Monti
Blake Langland
Earnie Broughton
University of South Carolina, USA

Room: Seminar 11
Sessions T33: Joint Session of Grand Challenges and Aerospace/ Space

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Session Co-Chairs: *Terry Ericsen, Office of Naval Research, USA*
Priscilla Elfrey, NASA, USA

3:00 pm to 3:30 pm
BREAK

ROOM: Theatre 8
3:30 pm to 5:00 pm
Sessions T14: Methodologies in Ship and Underwater Vehicle Models I
Session Chair: Kelly Cooper, Office of Naval Research, USA

EMPIRICAL DISTRIBUTION ENHANCED QUALITY FUNCTION DEPLOYMENT PROCESS FOR SHIP SYSTEMS DESIGN AND PLANNING
Stefanos Koullias, Janel Nixon and Dimitri Mavris

GRADIENT-FREE STOCHASTIC SENSITIVITY ANALYSIS OF THE SHIPBOARD POWER SYSTEM
P. Prempraneerach, J. Foo, M. S. Triantafyllou, C. Chryssostomidis and G. E. Karniadakis

PRACTICAL HYDRODYNAMIC OPTIMIZATION OF SHIP HULL FORMS
Chi Yang, Hyunyul Kim, Rainald Lohner and Francis Noblesse

MODELLING AND SIMULATION OF A BIOMIMETIC UNDERWATER VEHICLE
Chris Watts, Euan McGookin

ROOM: Seminar 9
3:30 pm to 5:00 pm
SESSION T24: Modeling and Simulation of Electrical Devices
Session Chair: *Roy Crosbie*
California State University – Chico, USA

MODELING AND VALIDATION OF AN OVERCURRENT RELAY USING LABVIEW AND RTDS
Sunil Palla, Anurag Srivastava and Noel Schulz

SWITCHING LOSS OPTIMIZATION IN HYSTERESIS-CURRENT-CONTROLLER DRIVEN DIRECT-MATRIX CONVERTER USING MATLAB/SIMULINK
Rashmi Prasad, Krushna Mohapatra and Ned Mohan

PARTICLE SWARM OPTIMIZATION OF SYNRM FOR TRACTION APPLICATIONS
A.A. Arkadan and M.N. ElBsat

Design Optimization of Hybrid Electric Vehicle Power Train Using Particle Swarm Optimization
Nizar Alawar and A.A. Arkadan

Wednesday, June 18, 2008

ROOM: Theatre A
8:00 am to 10:00 am

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Session: W11: Methodologies in Ship and Underwater Vehicle Models II
Session Chair: Kelly Cooper, Office of Naval Research, USA

APPLICATIONS OF INVERSE SIMULATION METHODS TO A NONLINEAR MODEL OF AN UNDERWATER VEHICLE
David Murray-Smith, Linghai Lu and Euan McGookin

MULTI-PARTY, MULTI-RATE SIMULATION OF AN UNMANNED UNDERWATER VEHICLE
John Zenor, Richard Bednar and Sourabh Bhalerao

MULTI-DIMENSIONAL ADAPTIVE COLLOCATION AND ELECTRIC SHIP MODELS
Joshua Taylor and Franz Hover

ALL ELECTRIC SHIPS, INTERNAL COMPARTMENTS AND CABINETS THERMAL AND PSYCHROMETRIC SIMULATION
Jose Vargas, Juan Ordonez and Rob Hovsapian

Analysis of Shipboard Reconfigurable Fire Main Systems
Donald Dalessandro, Ortiz Albert, Kevin Brown, Qing Dong, Li Bai and Saroj Biswas

ROOM: Theatre B
8:00 am to 10:00 am
Session: W21: Simulation Methods for Nonlinear, Discontinuous, and Dynamic Systems I
Session Chair: Joe Borraccini, Office of Naval Research, USA

SIMULATING LOW TEMPERATURE ELECTROMIGRATION AND THERMOMIGRATION IN POWER ELECTRONICS PACKAGING
Cemal Basaran

SIMULATIONS TO STUDY THE STABILITY ISSUES IN A SHIPBOARD POWER SYSTEMS
Yamilka Baez-Rivera, Noel Schulz and Anurag Srivastava

TOWARDS A SOCIAL RESPONSIBLE AGENTS IN HYBRID ORGANIZATION
Mhamed Itmi

DAMPING IMPEDANCE METHOD FOR MULTI-RATE PARALLEL SIMULATION OF NATURAL-BASED SYSTEMS
Rodrigo Leonard, Philip Crapse, Yucheng Zhang, Roger Dougal and Blake Langland

NONLINEAR HULL FORM TRANSFORMATION FOR USE WITH DESIGN OPTIMIZATION
Steven Zalek, Robert Beck and Michael Parsons

ROOM: Seminar 9
8:30 am to 10:00 am
Session W31: Complex System Modeling
Session Chair: Narain Hingorani, Consultant, USA

Model Development of Large-Scale DoD System-of-Systems
Santiago Balestrini Robinson, Yongchang Li, Janel Nixon and Dimitri

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Mavris

SYSTEM MODELING FOR POWER ELECTRONIC.
Luis Garcés Xianghui Huang

SIMULATING DEGRADATION IN HIGH DENSITY POWER ELECTRINICS PACKAGING
Cemal Basaran

COMPARATIVE ASSESSMENT OF DIFFERENTIAL RELAY MODEL PERFORMANCE WITH HARDWARE EQUIPMENT
Vamsi Vijapurapu, Noel Schulz, Anurag Srivastava and Jimena Bastos

10:00 am to 10:30 am
BREAK

ROOM: Theatre A
10:30 am to 12:00 noon
Session W12: Multidiscipline and Multi-rate Simulation
Session Chair: David Murray-Smith
University of Glasgow, UK

MOLECULAR DYNAMIC SIMULATIONS OF AN ATOMIC VACANCY IN FCC METAL
Cemal Basaran

APPLICATION OF A MULTIPLAYER COMPUTER GAMING PARADIGM TO ENGINEERING DESIGN TOOLS
Roger Dougal and Jijun Tang

MODELLING OF SUBMARINE POWER SYSTEMS USING MATLAB/SIMULINK
Darren Browning and Andrew Bennett

Modeling and Simulation of MAS-Based Reconfiguration for an Integrated Power System
Qiuli Yu and Noel Schulz

ROOM: Theatre B
10:30 am to 12:00 noon
Session W22: Methodologies in System Modeling and Design
Session Chair: Noel Schultz, Mississippi State University, USA

DESIGN AND BASIC EVALUATION OF HIGH PERFORMANCE SIMULATION ENGINE FOR HLA DISTRIBUTED SIMULATION
Atsuo Ozaki, Kazutaka Matsushita, Masashi Shiraishi, Shusuke Watanabe, Masakazu Furuichi and Hiroyuki Sato

IMPACT OF TYPE-2 FUZZY SETS ON AN EXISTING HYBRID AGENT SET-BASED DESIGN EXPERIMENT
Alexander Gray and David Singer

CHALLENGES IN UNCERTAINTY-BASED, SELF-CONFIGURING SIMULATION FOR DESIGN SUPPORT
Ferdinanda Ponci

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Reconfiguration of Heterogeneous Systems Using Distributed Controls
Karl Schoder, Sanjeev Srivastava, Andreas Poelzleitner and David Cartes

ROOM: Seminar 9
10:30 am to 12:00 noon

Session: W32: ESL Tutorial
Session Chair: Lionel Brooks, California State University – Chico
Speaker: John Pearce
ISIM International Simulation Limited

Lunch Break
12:00 pm – 1:30 pm

ROOM: Theatre A
1:30 pm to 3:00 pm
Session W13 Modeling and Environmental Issues
Session Chair: *Mhamet Itmi, INSA-ROUEN, France*

Simulating A PREDATOR/PREY RELATIONSHIP
Charles Knadler

DESIGN OF A SPATIAL AND STOCHASTIC SIMULATOR FOR BIRDFLU SPREADING IN CORSICA
David Hill

ENVIRONMENTAL CHALLENGES OF INTERMODAL TRANSPORTATION
Dietmar P. F. Möller and Volker Gollnick

ROOM: Theatre B
1:30 pm to 3:00 pm
Session W23: Models as Specification
Session Chair: Terry Ericsen, Office of Naval Research, USA

LOSS ESTIMATION IN HIGH FREQUENCY AC LINK POWER ELECTRONIC TRANSFORMER BY SABER SIMULATION
Kaushik Basu, Amod Umarikar, Krishna Keshab Mohapatra and Ned Mohan

MODELLING OF CASCADED AND INTERLEAVED SWITCHED MODE POWER CONVERTERS USING BOND GRAPHS
Amod Umarikar and Ned Mohan

SIMULATION MODEL OF A THREE-PORT BI-DIRECTIONAL SERIES RESONANT DC-DC CONVERTER TO DETERMINE COMPONENT SPECIFICATIONS
Hariharan Krishnaswami and Ned Mohan

LOGICAL ANALYSIS OF DEVS MODELS USING Z
Mohamed Wassim Trojet, Amine Hamri and Claudia Frydman

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ROOM: Seminar 9
1:30 pm to 3:00 pm
Session W33: ESL Tutorial
Session Chair: Lionel Brooks, California State University – Chico
Speaker: John Pearce
ISIM International Simulation Limited

3:00 pm to 3:30 pm
Break

ROOM: Theatre A
3:30 pm to 5:00 pm
Session W14: Simulation Tools and Applications
Session Chair: Hamid Vakilzadian
University of Nebraska-Lincoln, USA

THE MICROMAGNETIC MODELING AND SIMULATION KIT (M³S) FOR THE SIMULATION OF THE DYNAMIC RESPONSE OF FERROMAGNETS DUE TO ELECTRIC CURRENTS.
Massoud Najafi, Benjamin Krüger, Stellan Bohlens, Gunnar Selke, Markus Bolte and Dietmar P.F Möller

CERTIFY: A PARAMETER EXTRACTION TOOL FOR POWER SEMICONDUCTOR DEVICE MODELS
Weifeng Li, Yongfeng Feng, Peter Wilson, Alan Mantooth, Enrico Santi and Jerry Hudgins

SIMULATION ADVANCES USING THE ESL SIMULATION LANGUAGE AND THE VIRTUAL TEST BED
John Pearce

SimExplorer: a tool to manage the traceability and execution of simulation experiments
Thierry Faure, Guillaume Deffuant, Nicolas Dumoulin, Florent Chuffart and Romain Reullion

ROOM: Theatre 8
3:30 pm to 5:00 pm
Session W24: Model-Based Specification, Simulation Based Acquisition, and Uncertainty

Session Chair: Terry Ericsen, Office of Naval Research, USA

USING MATHEMATICAL AND SCIENTIFIC MARKUP AS AN APPROACH TO MODEL SPECIFICATION
Joseph Collins

USE OF MODELS IN THE SPECIFICATION AND PROCUREMENT OF POWER ELECTRONIC EQUIPMENT IN POWER SYSTEMS
Ani Gole, Shaahin Filizadeh, Dennis Woodford and Randy Wachal

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CONSIDERING UNCERTAINTY IN ASSESSMENT OF IMPACT OF PULSE LOAD CHARGING EVENT ON SHIPBOARD POWER SYSTEM
James Langston, Josh Taylor, Franz Hover, James Simpson, Michael Steurer and Thomas Baldwin

Uncertainty Analysis of Large-Scale Power Systems Using Collocation
Joshua Taylor, Franz Hover and Abdelhamid Ouroua

IMPROVING REQUIREMENTS DEFINITION FOR SYSTEMS IN THE SEABASING CONCEPT THROUGH INTERACTIVE VISUALIZATION
Elise Beisecker, Christianna Taylor, Janel Nixon and Dimitri Mavris

ROOM: Seminar 9
3:30 pm to 5:00 pm
Session W34: Nonlinear, Discontinuous, and Dynamic Systems II
Session Chair: Dietmar Moeller, University of Hamburg, Germany

GENERALIZED NON-LINEAR TERMINAL MODELING: ELECTRO-MAGNETIC INTERFERENCE
Andrew Baisden, Dushan Boroyevich and Fred Wang

AIR GAP FLUX ESTIMATION OF DUAL STATOR WINDING INDUCTION MACHINE USING WINDING FUNCTION APPROACH
Zhiqiao Wu and Olorunfemi Ojo

PROPAGATION OF UNCERTAINTY THROUGH SIGNAL FLOW SIMULATION USING POLYNOMIAL CHAOS THEORY
Anton Smith, Antonello Monti and Ferdinanda Ponci

Black-Box Modeling of a Flyback Converter
Luis Arnedo, Dushan Boroyevich, Rolando Burgos and Fred Wang

Thursday, June 19, 2008

ROOM: Theatre A
8:00 am -10:00 am
Sessions Th11: M&S of Large Scale systems
Session Chair: Roger Dougal, University of South Carolina, USA,

DISTRIBUTED SIMULATION OF A LARGE SCALE POWER DISTRIBUTION NETWORK
Michael Kleinberg, Karen Miu and Chika Nwankpa

FPGA-BASED LARGE-SCALE PARALLEL POWER SYSTEM SIMULATION
Yan Shi and Antonello Monti

MODELING TOPOLOGICAL SURVIVABILITY OF POWER SYSTEMS
Svetlana V. Poroseva, M. Yousuff Hussaini and Stephen L. Woodruff

A NEW METHODOLOGY FOR AUTOMATED ASSESSMENT OF FAULT DETECTION AND ISOLATION POTENTIAL IN LARGE POWER SYSTEMS
Dilek Düstegör, Svetlana V. Poroseva, M. Yousuff Hussaini and Stephen L. Woodruff

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MODEL CREATION FOR ALL ELECTRIC SHIP (AES) POWER SYSTEMS
Peter R. Wilson, H. Alan Mantooth, Enrico Santi and Jerry Hudgins

Room: Theatre B
8:00 am -10:00 am
Sessions Th21: ACSL (acslXtreme) Tutorial
Session Chair: Ralph Huntsinger
California State University – Chico, USA

Room: Seminar 9
8:30 am -10:00 am
Sessions Th31: INVERSE SIMULATION METHODS AND APPLICATIONS Workshop
Session Chair: David Murray-Smith
University of Glasgow, UK

Room: Seminar 11
8:30 am -10:00 am
Sessions Th41
Joint Session of Grand Challenges and Aerospace/ Space
Session Co-Chairs: Terry Ericsen, ONR
Priscilla Elfrey, NASA

10:00 am to 10:30 am
Break

Room: Theatre A
10:30 am -12:00 noon
Sessions Th12: Methodologies in Stability, Hardware, and Software Modeling
Session Chair: Ralph Huntsinger
California State University Chico, USA

RELIABILITY MODELING OF CIRCUITS WITH MULTI-STATE AGING GATES
Sanja Lazarova-Molnar and Valeriu Beiu

RESEARCH ON INDEPENDENT AND DYNAMIC FAULT-TOLERANT AND MIGRATION TECHNOLOGY FOR SIMULATION GRID RESOURCES
HOU Baocun, LI Bo Hu and CHAI Xudong

THE RELATIONSHIP BETWEEN SOFTWARE ARCHITECTURES AND VISUAL PROGRAMMING LANGUAGES
Adam Manzanares, Xiao Qin and Drew Hamilton

A VOLTAGE DRIVEN FIELD RECONSTRUCTION METHOD FOR MODELING OF ELECTROMECHANICAL ENERGY CONVERTERS
Babak Fahimi and Amir Khoobroo

Room
10:30 am to 12:00 noon

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Room: Theatre B
Sessions Th22: Real-Time Simulation
Session Chair: David Cartes, Florida State University, USA

USING FPGAS FOR ULTRA-HIGH-SPEED REAL-TIME SIMULATION
Dale Word, John Zenor and Robert Powelson

AUTOMATIC CONTROL PARAMETER OPTIMIZATION VIA CONTROLLER-IN-THE-LOOP REAL-TIME SIMULATION
Wei Ren, Mischa Steurer, Ilyop Chung, John Hauer and Ferenc Bogdan

DESIGNING AND TESTING PROTECTIVE OVERCURRENT RELAY USING REAL TIME DIGITAL SIMULATION
Ankush Saran, Padmavathy Kankanala, Anurag Srivastava and Noel Schulz

REAL-TIME SIMULATION AND OPTIMIZATION OF MULTI-SCALE SHIPBOARD POWER SYSTEMS
Yanhui Xie, Gayathri Seenumani and Jing Sun

Room: Seminar 9
10:30 am - 12:00 noon
Sessions Th32: INVERSE SIMULATION METHODS AND APPLICATIONS Workshop
Session Chair: David Murray-Smith
University of Glasgow, UK

12:00 pm – 1:30 pm
Lunch Break

Room: Theatre A
1:30 pm to 3:00 pm
Sessions Th13: Applications of Modeling and Simulation
Session Chair: Terry Ericsen, Office of Naval Research, USA,

ISOGEOMETRIC MODELING FOR FINITE ELEMENT ANALYSIS: B-SPLINE FINITE ELEMENT DEVELOPMENT WITH ROTATIONAL DEGREES OF FREEDOM
Hyun Chung and Dale Karr

HORIZONTAL INTERACTION OF TWO GAS BUBBLE COLUMNS
R. Mosdorf and Ralph Huntsinger

USING E-LEARNING TO ACHIEVE A SUSTAINABLE DEVELOPMENT OF HIGH QUALITY UNIVERSITY EDUCATION AS PART OF THE UNIVERSITY REFORM PROGRAM IN ETHIOPIA
Dietmar Möller, Gerhard Reik and Bernd Multhaup

MODELLING AND ANALYSIS OF A WIRE DRAWING MACHINE
Klemens Gregor Schulmeister and Martin Kozek

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Quantized State System Simulation

Keynote Speech by Dr. Francois Cellier

Institute of Computational Science
ETH Zürich, Switzerland

Abstract:

The talk introduces a new family of numerical ODE solvers called *Quantized State System (QSS)* methods. Given a set of ODEs in its state space representation, the QSS methods replace the classic time slicing by a quantization of the states, leading to an asynchronous discrete event simulation model instead of a discrete time difference equation model.

It will be shown that the QSS methods applied to stable linear time-invariant systems give always *practically stable* numerical results, irrespective of the quantization adopted. Taking into account that the QSS methods are explicit algorithms, this property has strong theoretical implications and offers a promising perspective for applications such as *real-time simulation of stiff systems*, where implicit solutions are usually unacceptable.

We shall also discuss the main properties of the methods in the context of simulating *discontinuous systems* (the asynchronous nature of these algorithms gives them important advantages for

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discontinuity handling) as well as *marginally stable (Hamiltonian) systems*, and we shall present some application examples as well as a software simulation tool that implements the QSS methods.

Biography:

François E. Cellier received his BS degree in electrical engineering in 1972, his MS degree in automatic control in 1973, and his PhD degree in technical sciences in 1979, all from the Swiss Federal Institute of Technology (ETH) Zurich. Dr. Cellier worked at the University of Arizona as professor of Electrical and Computer Engineering from 1984 until 2005. He recently returned to his home country of Switzerland. Dr. Cellier's main scientific interests concern modeling and simulation methodologies, and the design of advanced software systems for simulation, computer aided modeling, and computer-aided design. Dr. Cellier has authored or co-authored more than 200 technical publications, and he has edited several books. He published a textbook on Continuous System Modeling in 1991 and a second textbook on Continuous System Simulation in 2006, both with Springer-Verlag, New York.

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