

2005 International Conference on Bond Graph Modeling and Simulation (ICBGM'2005)

January 23 - 27, 2005

Wyndham New Orleans at Canal Place Hotel

- New Orleans, Louisiana U.S.A.

Part of the 2005 Western Simulation MultiConference

Sponsored by:

The Society for Modeling and Simulation International (SCS)

General Chair: Professor José J. Granda, California State University,
Sacramento USA

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Program Chair: Professor François E. Cellier, University of Arizona,
Tucson USA

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The 2005 International Conference on Bond Graph Modeling and Simulation brings together research paper presentations, panel sessions, tutorials, workshops, seminars, industrial applications, and software demonstrations that use Bond Graph modeling methods. There will be featured plenary speakers and some special invited presentations.

This conference focuses on Bond Graph modeling techniques for modeling and simulation of dynamic systems. Theoretical principles for electrical, mechanical, hydraulic, thermal, pneumatic, control and mechatronic systems applications will be presented. Leading industrial users of the method in automotive, aircraft, fluid power, kinematics, multibody systems, and social and biological systems have been invited.

M O N D A Y January 24, 2005

WMC PLENARY SESSION: 8:30am--10:00am

Keynote Address:

Col. Eileen A. Bjorkman, US Air Force Deputy Director, Capabilities Integration Directorate ASC/XR

SESSION 1: Monday 10:30am--12:00pm

Session Chair: **Geneviève Dauphin-Tanguy, France**

WELCOME. *Prof. José J. Granda, ICBGM'2005 General Chair
California State University, Sacramento USA*

Prof. François E. Cellier ICBGM'2005 Program Chair

University of Arizona, Tucson USA

THEORY

On the Role of Power Lines and Causal Paths in Bond Graph–based Model Inversion

Ngwompo, R.F., University of Bath, UK

Bideaux, E., Laboratoire d'Automatique Industrielle de Lyon, France

Scavarla, S., Laboratoire d'Automatique Industrielle de Lyon, France

A Procedure for Finding Invariants of Motions for General Class of Unsymmetric Systems with Gauge-variant Umbra Lagrangian Generated by Bond Graphs

Mukherjee, Amalendu, Indian Institute of Technology, India

Rastogi, Vikas, Indian Institute of Technology, India

Dasgupta, Anirvan, Indian Institute of Technology, India

Probabilistic Strategy Based Dynamic System Design Using Bond Graph and Genetic Algorithm

Wu, Zhaohong, University of Texas at Austin, USA

Fernández, Benito R., University of Texas at Austin, USA

Campbell, Matthew Ira, University of Texas at Austin, USA

SESSION 2: Monday 1:30am--3:00pm

Session Chair: François Cellier, U.S.A.

SYMBOLIC MANIPULATIONS

Optimised Procedures for Obtaining the Symbolic Equations of a Dynamic System by Using the Bond Graph Technique

Romero, G., Technical University of Madrid, Spain

Félez, J., Technical University of Madrid, Spain

Vera, C., Technical University of Madrid, Spain

Non-Commutative Ring Bond Graphs: Application to Flatness

Achir, A., LAGIS, France

Sueur, C., LAGIS, France

Elimination of Time Derivatives of Source Inputs

Breedveld, Peter C., University of Twente, Netherlands

System Partitioning and Improved Bond Graph Model Reduction Using Junction Structure Power Flow

Rideout, Geoff, University of Michigan, USA

Stein, Jeffrey L., University of Michigan, USA

Louca, Loucas S., University of Cyprus, Cyprus

SESSION 3: Monday 1:30pm--3:00pm

Session Chair: Joseph Juarez, U.S.A.

DISTRIBUTED PARAMETER MODELS

Field Theory With Bond Graphs: A Need for a Nabla Junction?

Brix, Frédéric, Imagine Japan K.K., Tokyo

Finite Element Local Structure Assembly and Shape Function Influence on Bond Graph Modelling

Derkaoui, Abdelchafik, INSA de Lyon, France

Bideaux, Eric, INSA de Lyon, France

Scavarda, Serge, INSA de Lyon, France

Bond Graph Modelling of Marine Seismic Cables

Pedersen, Tom Arne, The Norwegian University of Science and Technology, Norway

Pedersen, Arne, The Norwegian University of Science and Technology, Norway

SESSION 4: MONDAY 3:30PM--5:00PM

Session Chair: Amalendu Mukherjee, India

STEADY STATE BEHAVIOR

Symbolic Determination of the Steady State Due to Gravity Effects on Mechanical Systems Modelled by Bond Graphs

Dauphin-Tanguy, G., LAGIS, France

Niesner, C., LAGIS, France

Guillemard, F., PSA Peugeot-Citroen, France

Pengov, M., PSA Peugeot-Citroen, France

Steady-State Error for a Closed Loop Physical System With a Bond Graph Approach

González-A., Gilberto, University of Nuevo Leon, Mexico

and University of Michoacan, Mexico

Dauphin-Tanguy, G., LAGIS, France

Galindo, R., University of Nuevo Leon, Mexico

De Leon, J., University of Nuevo Leon, Mexico

SESSION 5: MONDAY 3:30PM--5:00PM

Session Chair: Sergio Junco, Argentina

CONTROL METHODOLOGY

System Efficiency Measurement Through Bond Graph Modeling

McBride, Robert T., Raytheon Missile Systems, USA

Cellier, François E., University of Arizona, USA

Optimal Controller Gain Selection Using the Power Flow Information of Bond Graph Modeling

*McBride, Robert T., Raytheon Missile Systems, USA
Cellier, François E., University of Arizona, USA*

Virtual Actuator Control of Mechanical Systems

*Gawthrop, Peter J., University of Glasgow, Scotland
Ballance, Donald J., University of Glasgow, Scotland*

Automatic Generation of all Bond Graph Structures Matching a Given Transfer Function

*Pirvu, Anca-Maria, University of Politehnica of Bucharest, Romania and LAGIS, France
Dauphin-Tanguy, Geneviève, LAGIS, France
Kubiak, Philippe, LAGIS, France*

T U E S D A Y January 25, 2005

SESSION 6: Tuesday 9:00am--10:00am

Session Chair: José Granda, U.S.A.

PLENARY SESSION

Bond Graphs for Modelling and Much More...

*Genevieve Dauphin-Tanguy
Ecole Centrale de Lille, France*

SESSION 7: Tuesday 10:30am--12:00pm

Session Chair: Peter Gawthrop, U.K.

ELECTRICAL SYSTEMS AND CONTROL

Bond Graph Modeling of Current Diffusion in Magnetic Cores

*Morel, Hervé, INSA de Lyon, France
Allard, Bruno, INSA de Lyon, France
M'Rad, Sabrina, INSA de Lyon, France
Buttay, Cyril, INSA de Lyon, France
Ammous, Kaicar, INSA de Lyon, France
Ammous, Anis, INSA de Lyon, France*

A Bond Graph Representation of an Optimal Control Problem: The Example of the DC Motor

*Marquis-Favre, Wilfrid, Laboratoire d'Automatique Industrielle, France
Chereji, Bogdan, Laboratoire d'Automatique Industrielle, France
Thomasset, Daniel, Laboratoire d'Automatique Industrielle, France*

Scavarda, Serge, Laboratoire d'Automatique Industrielle, France

BG-Supported Synthesis of Speed- and Position-Tracking Controllers for Brushless DC-Motor Drives

Junco, Sergio, Universidad Nacional de Rosario, Argentina

Donaire, Alejandro, Universidad Nacional de Rosario, Argentina

SESSION 8: Tuesday 10:30pm--12:00pm

Session Chair: Donald Margolis, U.S.A.

MECHANICAL SYSTEMS

Bond Graph Modeling of Stick-Slip Behavior in Friction Belt Drives

Chan, Garfull, University of California, Davis, USA

Karnopp, Dean, University of California, Davis, USA

Modelling for Transient Torsional Vibration Analysis in Marine Power Train Systems

Bruun, Kristine, The Norwegian University of Science and Technology, Norway

Pedersen, Eilif, The Norwegian University of Science and Technology, Norway

Valland, Harald, The Norwegian University of Science and Technology, Norway

Traffic Modeling by Applying the Bond Graph Technique

Lozano, J.A., Technical University of Madrid, Spain

Vera, C., Technical University of Madrid, Spain

Félez, J., Technical University of Madrid, Spain

Cabanellas, J.M., Technical University of Madrid, Spain

Study of the Inter-axis Coupling in Space Robot with Three Reaction Wheels as Attitude Controllers

Pathak, Pushparaj Mani, Indira Gandhi Engineering College, India

Kumar, Sandip, Indian Institute of Technology

Mukherjee, Amalendu, Indian Institute of Technology

Dasgupta, Anirvan, Indian Institute of Technology

SESSION 9: TUESDAY 1:30AM--3:00PM

Session Chair: Wolfgang Borutzky, Germany

SOFTWARE I

The CAMP-G Symbolic Solution to Algebraic Loops in Bond Graph Models

Granda, José, California State University Sacramento, USA

Model Transformation Tools (MTT): The Open Source Bond Graph Project

Ballance, Donald J., University of Glasgow, Scotland

Bevan, Geraint P., University of Glasgow, Scotland
Gawthrop, Peter J., University of Glasgow, Scotland
Diston, Dominic J., University of Manchester, England

PACTE, a Bond Graph Simulator for Electrical and Multi-physical Systems

Morel, Hervé, INSA-Lyon, France
Allard, Bruno, INSA-Lyon, France
Bevilacqua, Pascal, INSA-Lyon, France
Bergogne, Dominique, INSA-Lyon, France

SESSION 10: TUESDAY 3:30PM--5:00PM

Session Chair: Frédéric Brix, France

SOFTWARE II

Exchange and Reuse of Bond Graph Models Based on XML

Borutzky, W., Bonn-Rhein-Sieg University of Applied Sciencee, Germany

Next-Generation Transformation Tools for Scalable Integrated System Modelling

Diston, Dominic J., University of Manchester, England
Gawthrop, Peter J., University of Glasgow, Scotland
Bevan, Geraint P., University of Glasgow, Scotland
Ballance, Donald J., University of Glasgow, Scotland

Modeling and Simulation of Multi-Discipline Systems Using Bond Graphs and VHDL-AMS

Pecheux, F., LIP6/ASIM, France
Allard, B., INSA-Lyon, France
Lallement, C., PHASE, France
Vachoux, A., EPFL, Switzerland
Morel, H., INSA-Lyon, France

W E D N E S D A Y January 26, 2005

SESSION 11: Wednesday 8:30 pm.-10:00 p.m.

Session Chair: Jesús Félez, Spain

VEHICLES

Bond Graph Model of a Multi-Plate Clutch in a Vehicle System Using Fixed Causality Slip-Stick Friction

Margolis, Donald, University of California, Davis, USA

A 4 Wheel Vehicle Bond Graph Model Including Uncertainties on the Car Mass and the Centre of Mass Position

Niesner, C., Ecole Centrale de Lille, France
Dauphin-Tanguy, G., Ecole Centrale de Lille, France
Margolis, D., University of California, Davis, USA
Guillemard, F., PSA Peugeot-Citroen, France
Pengov, M., PSA Peugeot-Citroen, France

Modal Analysis of the Zvezda Mission of the Space Station With Bond Graphs

Elramady, Alyaa, California State University Sacramento, USA
Granda, José, California State University Sacramento, USA

Bond Graph Modeling of Rail Wheelset on Curved Track

Banerjee, N., Indian Institute of Technology, India
Karmakar, R., Indian Institute of Technology, India

SESSION 12: WEDNESDAY 8:30AM-10:00 A.M.

Session Chair: Forbes Brown, U.S.A.

THERMODYNAMICS

Thermal Model for Lead-Acid Batteries Using the Bond Graph Technique

Esperilla, J.J., Technical University of Madrid, Spain
Félez, J., Technical University of Madrid, Spain
Vera, C., Technical University of Madrid, Spain

Bond Graphs for Convective Heat Transfer Elements

Rietman, Jan, MSc(E), FIMarEST, Netherlands

Simulation of High Velocity Turbomachines

Thoma, Jean, University of Waterloo, Canada
Suzuki, Katsuya, Chukyo University, Japan
Mocellin, G., Straco Consulting SA, Switzerland

SESSION 13: Wednesday 10:30 am-12:00 PM.

Session Chair: Dean Karnopp, U.S.A.

APPLIED MECHANICS

Hybrid Lumped- and Delay-bond Modeling and Simulation

Brown, Forbes T., Lehigh University, USA

Bond Graph C-Field Representations for Tug & Twist Pneumatic Polymeric Actuator Technology

Juarez, Joseph M., Jr., ASME, USA
Longoria, Raul, University of Texas at Austin, USA

Building Experimental Test Beds for Complex Embedded Systems Using Hybrid Bond Graphs

John Ramirez, Gautam Biswas, Eric Manders

A Bond Graph Approach to Modelling of Spatial Flexible Multibody Systems Based on Co-rotational Formulation

*Damic, Vjekoslav, University of Dubrovnik, Croatia
Cohodar, Maida, University of Sarajevo, Bosnia and Hezegovina*

SESSION 14: Wednesday 10:30pm--12:00pm

Session Chair: Jeffrey Stein, U.S.A.

FAULT DETECTION

Improvements to Single Fault Isolation Using Estimated Parameters

*Ghoshal, Sanjoy Kumar, Indian Institute of Technology, India
Samantaray, Arun Kumar, Indian Institute of Technology, India
Mukherjee, Amalendu, Indian Institute of Technology, India*

Diagnostic Bond Graphs for Direct Residual Evaluation

*Medjaher, K., LAGIS, France
Samantaray, A.K., Indian Institute of Technology, India
Ould Bouamama, B., LAGIS, France*

SESSION 15: Wednesday 1:30pm--3:00pm (Joint Session with the International Conference on Health Sciences Simulation (HSS))

Session Chair: Jim Anderson, U.S.A.

MEDICINE

Study of the Cardiac Muscle Dynamics Utilising Bond Graph Methodology

*Fakri, A., Labo COSI, France
Rocaries, F., Labo COSI, France*

Spatiotemporal Wavefront Propagation in 3D Geometric Excitable Heart Tissue Utilizing Bond Graph Modelling Technique

*Tabatabai, G.F., Amirkabir University of Technology, Iran
Arshi, A.R., Amirkabir University of Technology, Iran
Mahmoudian, M., Iran Medical Sciences University, Iran*