7th GRACM
International Congress
on Computational Mechanics

Organized by the Greek Association of Computational Mechanics (GRACM)

Congress Program

30 June - 2 July 2011
National Center for Scientific Research “Demokritos”
Athens, Greece

http://www.7gracm.ntua.gr
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# 7th GRACM Congress Program Overview

**30 June – 2 July 2011, National Center for Scientific Research “Demokritos”, Athens, Greece**

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<th>Session Title</th>
<th>Thursday 30 June 2011</th>
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<tr>
<td>8:30</td>
<td>Registration</td>
<td>8:30 Registration</td>
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| 9:10          | Congress Opening      | 9:00 Plenary Lecture #3 (Steinmann) | 9:00 BEM probl. struct. mech.  
|               |                       | 9:00 CFD rotating mach. & comp.  
|               |                       | 9:00 Complex probl. mech. & eng. (D. Bardzokas memorial session)  
| 9:30          | Plenary Lecture #1 (Maroudas) | 10:00 ECCOMAS Olympiad Semi-Plenary Lecture #1 (van der Meer) |  
|               |                       | 10:00 ECCOMAS Olympiad Semi-Plenary Lecture #2 (Karaoulakis) | Soil mechanics  
| 10:15         | Plenary Lecture #2 (Baaijens) |  |  
| 11:00         | Coffee Break          | 10:30 Coffee Break | 11:40 Coffee Break |
| 11:20         | Structures A          | 11:00 Comp. bio. tissue eng. A  
|               | ECCOMAS Olympiad     | 11:00 High perf. sci. comp.  
|               | Finite & sing. elements | 11:00 Earthquake eng. A  
|               | Comput. meth. fluids | 11:00 M-scale model. comp. A  
|               | Industrial modeling   | 11:00 Transport phenomena  
| 13:20         | Lunch Break           | 13:00 Lunch Break | 12:00 Congress closing |
| 14:40         | Structures B          | 14:30 Comp. bio. tissue eng. B  
|               | ECCOMAS Olympiad     | 14:30 ECCOMAS Olympiad  
|               | Fluid mech. A        | 14:30 Earthquake eng. B  
|               |                      | 14:30 Structural dynamics A  
| 16:40         | Coffee Break          | 16:30 Coffee Break |  
| 17:10         | Num. impl. const. mod. | 17:00 Structures C  
|               | ECCOMAS Olympiad     | 17:00 ECCOMAS Olympiad  
|               | Fluid mech. B        | 17:00 Comp. mech. mater.  
|               | Comput. & syst. biol. | 17:00 Flows in porous media  
|               |                      | 17:00 Structural dynamics B  
| 19:30         | Free Night           | 21:00 Congress dinner |

**Notes:**

1. All papers are 20 minutes: 15 minutes presentation, 5 minutes discussion
2. Plenary lectures are 45 minutes: 40 minutes presentation, 5 minutes discussion
3. Semi-plenary lectures are 30 minutes: 25 minutes presentation, 5 minutes discussion
Room A: Conference Center Auditorium

Room B: Conference Center room

Room C: Institute of Physical Chemistry (IPC) Conference room

Room D: Institute of Material Science (IMS) Conference room

Room E: Institute of Micro-Electronics (IMEL) Conference room
Other Congress Activities

**Registration:** Conference Center – Reception hall

**Coffee Breaks:**
Thursday, 30 June, 11:00-11:20 @ Conference Center – Reception hall
Friday, 1 July, 10:30-11:00 @ Conference Center – Reception hall
Saturday, 2 July, 10:30-11:00 @ Conference Center – Reception hall
In all other breaks, coffee will be served at the conference room of each session

**Lunch Breaks:**
Lunch will be served @ Conference Center – Reception hall

**Congress Dinner:** Divani Caravel Hotel, Vassileos Alexandrou Av., 2, Athens – Roof Garden, Swimming-Pool, “Athens View” room,

**Congress Closing:** Conference Center – Reception hall and Conference room (B)
**Congress Program**

**Thursday, June 30th 2011**

8:30-9:30  Registration Desk Open

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9:10  **Congress Opening:** Andreas G. Boudouvis and Georgios E. Stavroulakis  
      Welcome addresses: Simos E. Simopoulos,  
      Rector, National Technical University of Athens  
      Manolis Papadrakakis,  
      President of ECCOMAS  
      Conferment of the ECCOMAS Awards of the Best 2010 PhD Theses on Computational Methods in Applied Sciences & Engineering

9:30  **Plenary Lecture #1**  
      Chair: A. G. Boudouvis  
      Dimitrios Maroudas  
      SURFACE MORPHOLOGICAL RESPONSE OF MECHANICAL STRESSES AND ELECTRIC FIELDS

10:15  **Plenary Lecture #2**  
       Chair: M. Papadrakakis  
       Frank Baaijens  
       HEART VALVE TISSUE ENGINEERING

11:00  **Coffee Break**
Thursday, June 30th
Parallel Session D1-A1, Room A

Structures A

Chair: D. S. Sophianopoulos, V. G. Vadalouka

11:20 DIRECT STABILITY ANALYSIS OF STEEL STRUCTURES: THEORY, SOFTWARE IMPLEMENTATION AND COMPUTATIONAL ASPECTS
D. S. Sophianopoulos and D.-C. P. Papadioti

11:40 A COMPUTATIONAL MODEL FOR STIRRUPS’ RESPONSE OF REINFORCED CONCRETE UNDER DYNAMIC LOADING
O. D. Kapetanou and V. G. Vadalouka

12:00 FINITE ELEMENT ANALYSIS OF MASONRY BARREL VAULTS
M. E. Stavroulaki and T. Tsinarakis

12:20 NUMERICAL MODELLING OF THE PULL-OUT OF INCLINED HOOKED STEEL FIBRES FROM HIGH-STRENGTH CEMENTITIOUS MATRIX
K. Georgiadi-Stefanidi, E. Mistakidis, A. Kapatsina and O. Panagouli

12:40 RELIABILITY ANALYSIS USING SUBSET SIMULATION AND NEURAL NETWORKS
V. Papadopoulos, D. G. Giovanis, N. Lagaros and M. Papadrakakis

Thursday, June 30th
Parallel Session D1-A2, Room B

1st ECCOMAS PhD Olympiad 2011

Chair: G. Bikakis, B. Klusemann

11:20 CONTRIBUTION TO THE STRENGTH DESIGN OF MECHANICAL STRUCTURES MADE OF ADVANCED LAMINATED MATERIALS
G. Bikakis (GRACM, Greece)

11:40 NONLINEAR MULTiresOLUTION ALGORITHMS AND VARIATIONAL PROBLEMS FOR IMAGE DENOISING
J. Ruiz (SEMA, Spain)

12:00 APPLICATION OF HOMOGENIZATION METHODS AND CRYSTAL PLASTICITY TO THE MODELING OF HETEROGENEOUS MATERIALS OF TECHNOLOGICAL INTEREST
B. Klusemann (GACM, Germany)

12:20 THE NATURAL NEIGHBOUR RADIAL POINT INTERPOLATION METHOD - SOLID MECHANICS AND MECHANOBIOLOGY APPLICATIONS
J. -A.-O. - P. Belinha (APMTAC, Portugal)

12:40 A LAGRANGIAN FINITE ELEMENT METHOD FOR THE INTERACTION BETWEEN FLEXIBLE STRUCTURES AND FREE SURFACES FLUID FLOWS
M. Cremonesi (AIMETA, Italy)
Thursday, June 30th
Parallel Session D1-A3, Room C (IPC)

Finite & Singular Elements

Chair: N. Pelekasis, A. Zervos

11:20 THE SINGULAR FUNCTION BOUNDARY INTEGRAL METHOD FOR 3-D LAPLACIAN PROBLEMS WITH A BOUNDARY STRAIGHT-EDGE SINGULARITY
E. Christodoulou, M. Elliotis, C. Xenophontos and G. C. Georgiou

11:40 AN ALGORITHM FOR CREATING TRIANGULAR C1 FINITE ELEMENTS WITH POLYNOMIAL INTERPOLATION
S.-A. Papanicolopulos and A. Zervos

12:00 SOLVING LARGE SCALE PROBLEMS IN MESHLESS EFG SIMULATIONS
P. Metsis and M. Papadrakakis

12:20 SOME ISSUES ON CAD/CAE INTEGRATION: GLOBAL INTERPOLATION USING ISOPARAMETRIC AND ISOGEOMETRIC TECHNIQUES
C. G. Provatidis

12:40 DESIGN AND IMPLEMENTATION OF A GENERAL PURPOSE FINITE ELEMENT LIBRARY
F. E. Karaoulanis

13:00 FINITE ELEMENT METHODS FOR 2-D FRICTIONLESS CONTACT PROBLEMS IN LINEAR ELASTICITY
E. E. Theotokoglou and A. Apostolatos

Thursday, June 30th
Parallel Session D1-A4, Room D (IMS)

Computational methods in fluids

Chair: V. G. Mavrantzas, T. Stylianopoulos

11:20 NON-EQUILIBRIUM FLOWS THROUGH MICRO-SLITS AND MICRO-ORIFICES
S. Misdanitis, S. Pantazis and D. Valougeorgis

11:40 AN UNSTRUCTURED NODE-CENTERED FINITE VOLUME METHOD FOR COMPUTING 3D VISCOUS COMPRESSIBLE FLOWS ON HYBRID GRIDS
G. N. Lygidakis and I. K. Nikolos

12:00 NON-EQUILIBRIUM MOLECULAR DYNAMICS SIMULATION OF THE STRETCHING BEHAVIOR OF ADHESIVE POLYMERS
A. Anastasiou, C. Baig and V. G. Mavrantzas

12:20 SOME CASE STUDIES OF MONTE CARLO AND MOLECULAR DYNAMICS SIMULATIONS
N. I. Papadimitriou, I. N. Tsimpanogiannis, M. E. Kainourgiakis and A. K. Stubos
Thursday, June 30th  
Parallel Session D1-A5, Room E (IMEL)

Industrial modeling

Chair: K. Petsounis, M. S. Shevtsova

11:20  **AN INTRODUCTION TO COMSOL MULTIPHYSICS: THE INDUSTRY-LEADING MULTIPHYSICS MODELING AND SIMULATION ENVIRONMENT**  
K. Petsounis

11:40 **FINITE ELEMENT MODELING OF POROUS PIEZOCOMPOSITE MATERIALS WITH DIFFERENT CONNECTIVITY AND APPLICATIONS FOR ANALYSIS OF ULTRASONIC TRANSDUCERS**  
T. V. Domashenkina, A. V. Nasedkin, V. V. Remizov and M. S. Shevtsova

12:00 **NUMERICAL SIMULATION OF CLAD PIPE STRUCTURAL BEHAVIOR UNDER BENDING LOADING**  
D. Vasilikis and S. A. Karamanos

12:20 **MECHANIC-STOCHASTIC MODEL FOR THE SIMULATION OF ELASTIC MATERIAL RESPONSE IN THIN METALLIC POLYCRYSTALS**  
J. Montalvo-Urquizo

12:40 **OPTIMIZATION OF THE ELECTROMAGNETIC CHARACTERISTICS OF A 3-PHASE SQUIRREL-CAGE INDUCTION MOTOR USING FEM**  
K. N. Gyftakis, I. Katsantonis and J. Kappatou

13:00 **APPLICATION OF THE MAXIMUM SCORE MAXIMUM PROFIT ESTIMATOR TO STOCKS OF THE BANKING SECTOR IN THE ATHENS STOCK EXCHANGE**  
K. Florios and G. Mavrotas

13:20  **Lunch Break**

Thursday, June 30th  
Parallel Session D1-B1, Room A

Structures B

Chair: V. K. Koumousis, E. J. Sapountzakis

14:40 **A BEAM ELEMENT FOR POSTBUCKLING ANALYSIS USING BEM**  
J. A. Dourakopoulos and E. J. Sapountzakis

15:00 **NONLINEAR ANALYSIS OF ELASTIC SPACE CABLE-SUPPORTED MEMBRANES**  
G. C. Tsiatas and J. T. Katsikadelis

15:20 **A THREE-DIMENSIONAL HYSTERETIC TIMOSHENKO BEAM ELEMENT WITH TORSIONAL WARping**  
S. P. Triantafyllou and V. K. Koumousis
15:40  RESPONSE VARIABILITY OF CYLINDRICAL SHELLS WITH STOCHASTIC SYSTEM PROPERTIES  
      G. Stefanou

16:00  ELASTOPLASTIC FRAME ANALYSIS WITH SOFTENING  
      IN THE FORM OF MIXED COMPLEMENTARITY PROBLEM  
      M. G. Rousis and V. K. Koumousis

16:20  DYNAMIC RESPONSE OF SINGLE DEGREE OF FREEDOM OSCILLATORS WITH STOCHASTIC  
      MATERIAL PROPERTIES  
      O. Kokkinos and V. Papadopoulos

Thursday, June 30th  
Parallel Session D1-B2, Room B

1st ECCOMAS PhD Olympiad 2011

Chair: M. Conti, Z. Bulinski

14:40  FINITE ELEMENT ANALYSIS OF CAROTID ARTERY STENTING  
      M. Conti (AIMETA, Italy)

15:00  MESHLESS NUMERICAL FORMULATION FOR ANALYSIS OF SHELL-LIKE STRUCTURES  
      T. Jarak (CEACM, Central Europe)

15:20  DEVELOPMENT OF A LATERALLY PRESSED QUADRILATERAL SHELL ELEMENT  
      S. Kugler (CEACM, Central Europe)

15:40  REDUCED INTEGRATION FINITE ELEMENT TECHNOLOGIES WITH APPLICATION TO SHEET  
      METAL FORMING  
      M. Schwarze (GAMM, Germany)

16:00  NUMERICAL MODELLING AND CREDIBILITY ANALYSIS OF FREE SURFACE FLOWS IN  
      SELECTED INDUSTRIAL PROCESSES  
      Z. Bulinski (PACM, Poland)

Thursday, June 30th  
Parallel Session D1-B3, Room C (IPC)

Fluid mechanics A

Chair: G. A. Athanassoulis, N. A. Malamataris

14:40  STEADY SOLUTIONS OF INERTIAL FILM FLOW ALONG STRONGLY UNDULATED  
      SUBSTRATES  
      P.-K. Nguyen and V. Bontozoglou

15:00  A FAST-CONVERGENT SPECTRAL METHOD FOR WAVE PROPAGATION AND SCATTERING  
      IN NON-UNIFORM WAVEGUIDES  
      G. A. Athanassoulis and K. A. Belibassakis
15:20  BIOMAGNETIC FLUID FLOW IN A DRIVEN CAVITY  
E. E. Tzirtzilakis and M. A. Xenos

15:40  MODELLING OF PARTICLE INERTIAL EFFECTS: AEROSOL DEPOSITION IN A 900 BEND  
M. Pilou, P. Neofytou, Y. Drossinos, S. Tsangaris and C. Housiadas

16:00  A NUMERICAL INVESTIGATION OF THE INFLUENCE OF ASPECT RATIO IN THREE-DIMENSIONAL, BACKWARD-FACING STEP  
N. A. Malamataris

Thursday, June 30th  
Parallel Special Session D1-B4, Room D (IMS)  
Computational and systems biology A

Organizer: Dr. M. I. Klapa, Foundation for Research and Technology – Hellas (FORTH)  
Chair: M. I. Klapa, P. V. Benos

14:40  OPTIMIZATION OF A LARGE SCALE SIGNALING NETWORK USING AN INTEGER LINEAR PROGRAMMING FORMULATION  

15:00  TOP-DOWN ANALYSES OF THE GENETIC CONTROL OF YEAST GROWTH UNDER A RANGE OF PHYSIOLOGICAL CONDITIONS  
K. Gkargkas, S. V. Avery and S. G. Oliver

15:20  INTEGRATING GENE REGULATORY AND METABOLIC MODELS TO PREDICT MICROBIAL GROWTH KINETICS  
M. Koutinas, A. Kiparissides, V. de Lorenzo, V. A.P. Martins dos Santos, E. N. Pistikopoulos and A. Mantalaris

15:40  MRNA-MICRORNA NETWORK INTEGRATION REVEALS BREAST CANCER SUBTYPE INTERACTIONS  
G. T. Huang, L. Santana-Santos, C. Athanassiou and P. V. Benos

16:00  RECONSTRUCTION OF THE KNOWN HUMAN PROTEIN-PROTEIN INTERACTION NETWORK FROM FIVE MAJOR LITERATURE-CURATED DATABASES  
K. Tsafou, E. Theodoridis, M. I. Klapa, A. Tsakalides and N. K. Moschonas

16:40  Coffee Break
### Thursday, June 30th
Parallel Special Session D1-C1, Room A

**Numerical implementation of constitutive models**

**Organizer:** Prof. S. Karamanos, Univ. Thessaly  
Chair: S. Karamanos, V. P. Panoskaltsis

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<td>17:10</td>
<td><strong>A NEW THEORY FOR SHAPE MEMORY ALLOY MATERIALS UNDER GENERAL STATES OF DEFORMATION AND TEMPERATURE CONDITIONS</strong></td>
<td>V. P. Panoskaltsis, D. Soldatos and S. P. Triantafyllou</td>
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<td>17:30</td>
<td><strong>J2 BOUNDING-SURFACE PLASTICITY MODELS FOR STRUCTURAL BEHAVIOR OF STEEL COMPONENTS SUBJECTED TO STRONG CYCLIC LOADING</strong></td>
<td>G. E. Varelis and S. A. Karamanos</td>
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<td>17:50</td>
<td><strong>IMPLEMENTATION OF A CYCLIC SOIL PLASTICITY MODEL IN A FINITE DIFFERENCE SOLUTION ALGORITHM</strong></td>
<td>K. I. Andrianopoulos, A. G. Papadimitriou and G. D. Bouckovalas</td>
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<td>18:10</td>
<td><strong>A HYSTERETIC QUADRILATERAL PLANE STRESS ELEMENT</strong></td>
<td>S. P. Triantafyllou, V. K. Koumousis</td>
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<td>18:30</td>
<td><strong>NUMERICAL IMPLEMENTATION OF J2 NON-ASSOCIATIVE FLOW PLASTICITY MODELS FOR SHELL BUCKLING IN THE INELASTIC RANGE</strong></td>
<td>P. Pappa and S. A. Karamanos</td>
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<td>18:50</td>
<td><strong>ON THE FORMULATION OF A SPECTRAL RETURN MAPPING ALGORITHM FOR NONSMOOTH MULTISURFACE VISCOPLASTICITY</strong></td>
<td>F. E. Karaoulanis</td>
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### Thursday, June 30th
Parallel Session D1-C2, Room B

**1st ECCOMAS PhD Olympiad 2011**

Chair: P. Farrell, X. Zhuang

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<td><strong>GALERKIN PROJECTION VIA SUPERMESH CONSTRUCTION</strong></td>
<td>P. Farrell (ACME, UK)</td>
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<td>17:30</td>
<td><strong>STABILIZED 3D X-FEM CRACK SIMULATION WITH INTERFACE FRICTIONAL CONTACT: APPLICATION TO FRETTING FATIGUE</strong></td>
<td>E. Pierres (CSMA, France)</td>
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<td>17:50</td>
<td><strong>LAGRANGIAN FE METHODS FOR COUPLED PROBLEMS IN FLUID MECHANICS</strong></td>
<td>P. Ryzhakov (SEMNI, Spain)</td>
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<td>18:10</td>
<td><strong>A MODEL FOR 3D FRACTURE USING A MESHLESS METHOD AND LEVEL SETS AND ITS APPLICATION IN GEOMECHANICS</strong></td>
<td>X. Zhuang (ACME, UK)</td>
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18:30 STRONG DISCONTINUITIES IN THE SCOPE OF THE DISCRETE CRACK APPROACH  
D. A. S. G. Dias-da-Costa (APMTAC, Portugal)

Thursday, June 30th  
Parallel Session D1-C3, Room C (IPC)

Fluid mechanics B

Chair: M. Fragiadakis, A. G. Papathanasiou

17:10 AERODYNAMIC AND STRUCTURAL INVESTIGATION OF A FULL COMPOSITE RADIO-CONTROLLED AIRCRAFT  
D. Mazarakos, D. Sikoutris, T. Kotzakolios and V. Kostopoulos

17:30 CFD MODELLING OF VERTICAL ELECTRICAL FURNACE FOR PERLITE EXPANSION – STUDY OF AIR TEMPERATURE AND VELOCITY PROFILES  
P. Angelopoulos, C. Kapralou and M. Taxiarhou

17:50 USE OF VIRTUAL INSTRUMENTATION AND COMPUTATIONAL FLUID DYNAMICS IN AN UNDERGRADUATE RESEARCH PROJECT  
E. I. Xanthopoulos, D. A. Tzempelikos, A. E. Filios and D. P. Margaris

Thursday, June 30th  
Parallel Special Session D1-C4, Room D (IMS)

Computational and systems biology B

Organizer: Dr. M. I. Klapa, Foundation for Research and Technology – Hellas (FORTH)  
Chair: M. I. Klapa, L. G. Alexopoulos

17:10 A KINETIC-METABOLIC MODEL TO STUDY THE ROLE OF CELL ENERGETIC STATE ON METABOLIC FLUX REGULATION  
M. Jolicoeur

17:30 COMPARING THE METABOLIC RESPONSE OF MALE AND FEMALE CEREBELLUM TO PROLONGED ADULT-ONSET HYPOTHYROIDISM IN A MOUSE MODEL USING METABOLIC PROFILING ANALYSIS  
C. C. Maga-Nteve, C. Constantinou, M. Margarity and M. I. Klapa

17:50 TACKLING CARTILAGE DEGENERATION VIA A COMBINATION OF SYSTEMS BIOLOGY AND BIOMECHANICS APPROACH  
L. G. Alexopoulos, K. Chairakaki, I. N. Melas, C. Provatidis, Z. Dailiana and A. Mitsos

18:10 DIFFUSION ANISOTROPY IN TUMORS: THE EFFECT OF FIBER ORIENTATION AND IMPLICATIONS TO DRUG DELIVERY  
T. Stylianopoulos, B. Diop-Frimpong and R. K. Jain
18:30 DYNAMICS OF ERYTHROCYTES IN THE MICROCIRCULATION VIA A NONSTIFF CYTOSKELETON-BASED CONTINUUM COMPUTATIONAL ALGORITHM
P. Dimitrakopoulos and W. R. Dodson III

Thursday, June 30th
Parallel Special Session D1-C5, Room E (IMEL)

17:10 - 19:30
Computational rheology

Organizers: Prof. G. C. Georgiou, Univ. Cyprus and Prof. E. Mitsoulis, National Technical Univ. Athens
Chair: G. C. Georgiou, E. Mitsoulis

17:10 MODELING OF THREE-DIMENSIONAL FLOW, HEAT TRANSFER, STRESS ANALYSIS IN HDPE EXTRUSION DIE
G. Kouzilos, N. I. Galanis, D. E. Manolakos

17:30 GENERALIZED VISCOELASTIC MODEL FOR POLYMER MELTS GUIDED BY PRINCIPLES OF NON-EQUILIBRIUM THERMODYNAMICS: SINGLE- AND MULTI-MODE FORMULATIONS
P. S. Stephanou, C. Baig and V. G. Mavrantzas

17:50 AN IMPROVED AUGMENTED LAGRANGIAN TECHNIQUE FOR FREE SURFACE VISCOPLASTIC FLOWS
M. Pavlidis, Y. Dimakopoulos and J. Tsamopoulos

18:10 RHEOLOGICAL BEHAVIOR OF SELF COMPACTING CONCRETE: SIMULATION OF THE SLUMP FLOW TEST
N. Constantinou, G. C. Georgiou and A. N. Alexandrou

18:30 CAPILLARY EFFECTS IN EXTRUDATE SWELL COMPUTATIONS: ARE THE Pressures Affected?
E. Mitsoulis and G. C. Georgiou

18:50 FREE (OPEN) BOUNDARY CONDITION REVISITED: SUITABLE AND UNSUITABLE APPLICATIONS
E. Mitsoulis and N. A. Malamataris

19:10 FINDING THE WETTING AND PINNING POINTS IN THE WIRE-PINNING PROCESS OF FILM CASTING
K. Christodoulou, S. G. Hatzikiriakos and E. Mitsoulis

19:30 Free Night
Friday, July 1st 2011

8:30-9:30  Registration Desk Open

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| 9:00   | Plenary Lecture #3  
Chair: G. E. Stavroulakis  
*P. Steinmann, S. Pfaller and G. Possart*  
COUPLED MD-FE MULTISCALE MODELLING AND SIMULATION OF POLYMERS |
| 10:00  | 1st ECCOMAS PhD Olympiad 2011  
Semi-Plenary Lecture #1, Room A  
Chair: N. D. Lagaros  
COMPUTATIONAL MODELING OF FAILURE IN COMPOSITE LAMINATES  
F. van der Meer (NMC, Netherlands) |
| 10:00  | 1st ECCOMAS PhD Olympiad 2011  
Semi-Plenary Lecture #2, Room B  
Chair: V. Papadopoulos  
MULTISURFACE ELASTOPLASTIC YIELD CRITERIA. NUMERICAL IMPLEMENTATION IN PRINCIPAL STRESS SPACE AND APPLICATION IN GEOTECHNICAL ENGINEERING PROBLEMS  
F. Karaoulanis (GRACM, Greece) |
| 10:30  | Coffee Break |
| 11:00  | THE COMPLETE SET OF VECTOR ELLIPSOIDAL HARMONICS AND THE INDEPENDENCE OF THE EEG AND MEG MEASUREMENTS  
G. Dassios |
| 11:40  | BIOMECHANICAL MODELLING OF SOFT TISSUES USING THE FINITE ELEMENT METHOD  
M. Satraki and J. P. Whiteley |
12:00 APPLICATION OF THE FICTICIOUS DOMAIN/LAGRANGE MULTIPLIER METHOD ON THE SIMULATION OF THE AORTIC VALVE
Y. Dimakopoulos, A. Bogaerds, P. Anderson, M. Hulsen and F. Baaijens

12:20 ON DRUG DELIVERY SIMULATION – MODELING MOTION OF CIRCULAR AND ELLIPTICAL PARTICLES IN LAMINAR FLOW
V. Isailovic, M. Kojic, M. Ferrari, N. Zdravkovic and N. Filipovic

12:40 COMPUTATIONAL SERVICES FOR IN SILICO ONCOLOGY: EXPERIENCES AND RESEARCH CHALLENGES
K. Marias, G. Stamatakis, D. Dionysiou, V. Sakkalis, S. Sfakianakis and M. Tsiknakis
11:20  MINIMUM COST SEISMIC DESIGN OF THIN-WALL STEEL LIQUID STORAGE TANKS
M. K. Minoglou, G. D. Hatzigeorgiou and G. A. Papagiannopoulos

11:40  PERFORMANCE-BASED SEISMIC DESIGN FRAMEWORKS USING STRUCTURAL OPTIMIZATION
M. Fragiadakis and N. D. Lagaros

12:00  FREQUENCY-DEPENDENT MODAL DAMPING RATIOS IN LINEAR NON-CLASSICALLY DAMPED SEISMICALLY EXCITED FRAMES
G. A. Papagiannopoulos, G. D. Hatzigeorgiou and D. E. Beskos

12:20  SIZING OPTIMIZATION OF COLLAPSE-RESISTANT FRAMES
A. Kontogiannis and D. C. Charmpis

12:40  OPTIMAL SEISMIC DESIGN OF STRUCTURES USING APPROXIMATE METHODS
A. Zacharenaki, M. Fragiadakis and M. Papadrakakis

Friday, July 1st
Parallel Special Session D2-A4, Room D (IMS)

Multiscale modeling and computations A

Organizers: Dr. G. Kokkoris, NCSR “Demokritos” and Prof. C. I. Siettos, National Technical Univ. Athens
Chair: G. Kokkoris, C. I. Siettos

11:00  A ROBUST, PRACTICAL, AND GENERAL METHOD FOR COUPLED ITERATIONS OF BLACK-BOX NONLINEAR SOLVERS BY AN APPROXIMATE BLOCK NEWTON METHOD
J. J. Derby and A. Yeckel

11:40  DEVELOPMENT OF NAVIER-STOKES/MOLECULAR DYNAMICS ADAPTIVE COUPLING TECHNIQUES WITHIN A MULTI-PHYSICS FRAMEWORK
R. Steijl and G. N. Barakos

12:00  WETTING PHENOMENA ON MICRO-STRUCTURED SURFACES
M. E. Kavousanakis, C. E. Colosqui, I. G. Kevrekidis and A. G. Papathanasiou

12:20  MULTISCALE COMPUTATIONS IN CHEMICAL VAPOR DEPOSITION PROCESSES: COUPLING A REACTOR WITH A FEATURE SCALE MODEL
S. Garnelis, N. Cheimarios, G. Kokkoris and A. G. Boudouvis

12:40  MULTISCALE BLOCK MATCHING FOR CAROTID ARTERY WALL MOTION ESTIMATION FROM B-MODE ULTRASOUND
A. Gastounioti, N. N. Tsiaparas, S. Golemati and K. S. Nikita
### Transport phenomena

Chair: D. V. Papavassiliou, Y. H. Polandov

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<td>11:00</td>
<td>TURBULENT HEAT AND MASS TRANSFER SIMULATIONS USING LAGRANGIAN METHODS AND DIRECT NUMERICAL SIMULATIONS</td>
<td>D. V. Papavassiliou and C. Srinivasan</td>
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<td>11:20</td>
<td>DISPERSION OF TOXIC CONTAMINANTS FROM LARGE TANK FIRES AND PARAMETRIC ANALYSIS FOR VARIOUS SIZES OF TANKS</td>
<td>C. D. Argyropoulos, V. E. Sasirmaz, M. N. Christolis, Z. S. Nivolianitou and N. C. Markatos</td>
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<td>11:40</td>
<td>POLLUTANT DISPERSION STUDY IN ASYMMETRIC STREET CANYONS USING LARGE EDDY SIMULATION</td>
<td>N. Koutsourakis, A. G. Venetsanos, J. G. Bartzis, I. C. Tolias and N. C. Markatos</td>
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<td>12:00</td>
<td>ON THE DECREASING OF THE BURNOUT TIME FOR A GAS-AIR MIXTURE IN A CLOSED VOLUME</td>
<td>Y. H. Polandov, M. A. Barg and V. A. Babankov</td>
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<td>12:20</td>
<td>EXPLORING THE SOLUTION SPACE OF A MIXED FLOW CVD REACTOR WITH A COMMERCIAL COMPUTATIONAL CODE</td>
<td>A. Trikouraki, N. Cheimarios, E. D. Koronaki and A. G. Boudouvis</td>
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<td>12:40</td>
<td>COMPUTATIONAL METHODS TO STUDY THE TRANSPORT PROPERTIES OF THE Na/Ca EXCHANGER</td>
<td>S. Bahlouli, F. Hamdache and H. Riane</td>
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#### Lunch Break

**Friday, July 1st**

**Parallel Special Session D2-B1, Room A**

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14:50 THREE-DIMENSIONAL NUMERICAL SIMULATION OF PLAQUE FORMATION AND DEVELOPMENT IN THE ARTERIES
N. D. Filipovic, N. Meunier, O. Parodi and D. I. Fotiadis

15:10 A DEVICE FOR MULTIPLE INDENTATION TESTS OF CARTILAGE DISKS

15:30 PARAMETRIC STABILITY AND SIMULATIONS OF INSONATED CONTRAST AGENTS-EFFECT OF THE CONSTITUTIVE LAW
N. Pelekasis, K. Efthimiou and K. Tsiglifis

Friday, July 1st
Parallel Session D2-B2, Room B
1st ECCOMAS PhD Olympiad 2011

Chair: C. F. Kirches, J. Healy

14:30 FAST NUMERICAL METHODS FOR MIXED-INTEGER NONLINEAR MODEL PREDICTIVE CONTROL
C. F. Kirches (GAMM, Germany)

14:50 NUMERICAL MODELLING OF HEAT, MASS AND MOMENTUM TRANSFER IN NATURAL DRAFT WET-COOLING TOWER
A. Klimanek (PACM, Poland)

15:10 GEOMETRIC MULTIGRID METHODS ON SEMI-STRUCTURED TRIANGULAR GRIDS
C. Rodrigo (SEMA, Spain)

15:30 TREFFTZ-BASED MID-FREQUENCY ANALYSIS OF GEOMETRICALLY COMPLEX VIBRO-ACOUSTIC SYSTEMS - HYBRID METHODOLOGIES AND MULTI-LEVEL MODELLING
B. van Genechten (NCTAM/BNCM, Belgium)

15:50 NUMERICAL APPROXIMATION OF THE LINEAR CANONICAL TRANSFORM AND APPLICATIONS
J. Healy (ISSEC, Ireland)

Friday, July 1st
Parallel Session D2-B3, Room C (IPC)
Earthquake engineering B

Chair: N. Bazeos, A. J. Kappos

14:30 SEISMIC INELASTIC RESPONSE AND DUCTILITY ESTIMATION OF STEEL PLANAR CHEVRON-BRACED FRAMES
H. Stamatopoulos and N. Bazeos
14:50 CORRELATION BETWEEN GROUND MOTION INTENSITY MEASURES AND DAMAGE INDICES IN CASE OF AN ASYMMETRIC 3D R/C BUILDING
I.- K. M. Fontara, A. M. Athanatopoulou and E. I. Avramidis

15:10 INELASTIC POUNDING OF ADJACENT REINFORCED CONCRETE STRUCTURES UNDER MULTIPLE EARTHQUAKES
S. Efraimiadou, G. D. Hatzigeorgiou and A. A. Liolios

15:30 EVALUATION OF MAXIMUM SEISMIC DISPLACEMENTS OF STEEL FRAMES FROM RESIDUAL DISPLACEMENTS
A. Christidis, E. Dimitroudi, G. D. Hatzigeorgiou and D. E. Beskos

15:50 THE EFFECT OF GRAVITY LOADS ON SEISMIC PERFORMANCE OF SPECIAL MOMENT RESISTING STEEL FRAMES
D. Özhendekci and N. Özhendekci

16:10 LOCAL DAMAGE INDEX FOR SEISMIC ASSESSMENT OF GRAVITY LOAD DESIGNED R/C STRUCTURES
P. E. Mergos and A. J. Kappos

Friday, July 1st
Parallel Special Session D2-B4, Room D (IMS)

Multiscale modeling and computations B

Organizers: Dr. G. Kokkoris, NCSR “Demokritos” and Prof. C. I. Siettos, National Technical Univ. Athens
Chair: G. Kokkoris, C. I. Siettos

14:30 BRIDGING LENGTH SCALE IN FLUID PHASE EQUILIBRIUM VIA HISTOGRAM REWEIGHTING OF GIBBS ENSEMBLE MONTE CARLO SIMULATIONS
G. C. Boulougouris, L. Peristeras, I. G. Economou and D. N. Theodorou

14:50 MOLECULAR DYNAMICS SIMULATION OF IMIDAZOLIUM-BASED [Tf2N-] IONIC LIQUIDS
E. Androulaki, N. Vergadou, J. Ramos and I. G. Economou

15:10 FLUID FLOW IN CONSTRICTED TUBES AND POROUS DOMAINS USING LATTICE-BOLTZMANN AND MESHLESS SOLVERS
G. C. Bourantas, A. N. Kalarakis, V. C. Loukopoulos, E. D. Skouras and V. N. Burganos

15:30 SYSTEM REDUCTION FOR NONLINEAR MULTISCALE DYNAMICAL SYSTEMS: MANIFOLD COORDINATES
P. D. Kourdis and D. A. Goussis

15:50 A REVIEW ON MULTISCALE MODELING IN COMPLEX BIOLOGICAL SYSTEMS: THE TUMOR GROWTH PARADIGM

16:10 MOTION OF ELASTIC CAPSULES IN MICROFLUIDIC CHANNELS
P. Dimitrakopoulos and S. Kyriakose
Friday, July 1st
Parallel Session D2-B5, Room E (IMEL)

Structural dynamics A

Chair: A. D. Muradova, C. G. Provatidis

14:30 GLOBAL VERSUS LOCAL INTERPOLATION IN THE FEM FREE VIBRATION ANALYSIS OF PRISMATIC BARS
C. G. Provatidis

14:50 AXIAL VIBRATION OF VISCOELASTIC BARS USING THE FINITE-ELEMENT METHOD
A. Keramat and A. Ahmadi

15:10 FUZZY CONTROL OF A SMART ELASTIC PLATE
A. D. Muradova and G. E. Stavroulakis

15:30 B-SPLINES COLLOCATION EIGENVALUE ANALYSIS OF 1-D PROBLEMS
C. G. Provatidis and S. K. Isidorou

15:50 ADAPTIVE FUZZY CONTROL OF SMART STRUCTURE - ANFIS
I. Papachristou, S. Salonikidis, G. K. Tairidis and G. E. Stavroulakis

16:30 Coffee Break

Friday, July 1st
Parallel Session D2-C1, Room A

Structures C

Chair: A. A. Liolios, E. Mistakidis

17:00 THE EFFECT OF THE GEOMETRIC IMPERFECTIONS ON THE ROTATIONAL CAPACITY OF STEEL BEAMS AT ELEVATED TEMPERATURES
D. Pantousa and E. Mistakidis

17:20 NONLINEAR SIMULATION OF REAL-SCALE RC STRUCTURES WITH DETAILED AND HYBRID FINITE ELEMENT MODELS
G. Markou and M. Papadrakakis

17:40 BUILDING FIRE BEHAVIOUR IMPLEMENTING GYPSUM PLASTERBOARDS CONTAINING PHASE CHANGE MATERIALS: A CFD STUDY
D. I. Kolaitis, E. Asimakopoulou and M. A. Founti

18:00 THERMAL - STRESS ANALYSIS OF A 3 DIMENSIONAL END – PLATE STEEL JOINT
A. Kalogeropoulos, G. A. Drosopoulos and G. E. Stavroulakis
1st ECCOMAS PhD Olympiad 2011

Chair: C. Bellis, L. Steffens

17:00 QUALITATIVE METHODS FOR INVERSE SCATTERING IN SOLID MECHANICS
C. Bellis (CSMA, France)

17:20 OPTIMIZATION OF RAILWAY VEHICLES FOR CRASHWORTHINESS
J. F. de Almeida Milho (APMTAC, Portugal)

17:40 EXPLORING THE PHYSICS OF FRAGMENTATION THROUGH PARALLEL SIMULATIONS
S. Levy (SWICCOMAS, Switzerland)

18:00 NUMERICAL ANALYSIS OF THE NONLINEAR DYNAMICS OF A DRILL-STRING WITH UNCERTAINTY MODELING
T. Ritto (CSMA, France)

18:20 ASSESSMENT OF THE DISPERSION ERROR AND GOAL-ORIENTED ADAPTIVITY FOR WAVE PROBLEMS
L. Steffens (SEMNI, Spain)

18:40 VISCOPlastic DAMAGE ANALYSIS OF PLATE-SHELL STRUCTURES SUBJECTED TO IMPACT LOADING
L. Pyrzowski (PACM, Poland)

Computational mechanics of materials

Chair: P. Papanastasiou, E. E. Theotokoglou

17:00 CONTINUOUS INTERIOR PENALTY FINITE ELEMENT METHOD FOR STRAIN GRADIENT ELASTICITY
K. G. Eptaimeros and G. J. Tsamasphyros

17:20 PREDICTION OF THE CRACK KINKING IN A SANDWICH STRUCTURE BEAM SUBJECTED TO THREE POINT BENDING USING THE J INTEGRAL CONCEPT
I. I. Tourlomousis and E. E. Theotokoglou

17:40 GENERALIZED VARIATIONAL PRINCIPLE AND ENERGY THEOREMS FOR LINEAR STRAIN GRADIENT ELASTICITY
D. A. Fafalis and G. J. Tsamasphyros

18:00 A MIXED FINITE-VOLUME-ELEMENT (FVE) FORMULATION FOR THE SOLUTION OF TYPE-III STRAIN GRADIENT ELASTICITY PROBLEMS
D. A. Fafalis and G. J. Tsamasphyros
18:20  PLASTIC ZONE SCALING OF HYDRAULIC FRACTURES IN COHESIVE POROELASTOPLASTIC CONTINUUM  
E. Sarris and P. Papanastasiou

18:40  INVESTIGATION OF SHEAR INSTABILITY IN ORTHOGONAL MACHINING OF Ti6Al4V ALLOY USING THE FINITE ELEMENT METHOD  
O. Friderikos, A. Korlos, C. David and I. Tsiafis

Friday, July 1st
Parallel Session D2-C4, Room D (IMS)

Flows in porous media

Chair: F. A. Coutelieris, M. S. Valavanides

17:00  THEORETICAL INVESTIGATION OF FLOW AND MASS TRANSPORT IN GRANULAR POROUS MEDIA FOR A REALISTIC SORPTION MECHANISM  
F. A. Coutelieris

17:20  FROM PORE TO NETWORK TO DeProF TO aSaPP: TOWARDS A COMPLETE DESCRIPTION OF STEADY-STATE TWO-PHASE FLOW IN POROUS MEDIA, SPANNING PORE- TO STATISTICAL THERMODYNAMICS- SCALES  
M. S. Valavanides

17:40  IMPLEMENTATION OF THE DeProF THEORY FOR STEADY-STATE TWO-PHASE FLOW IN POROUS MEDIA TO IMPROVE MASS TRANSFER AROUND RECTILINEAR SINKS/SOURCES  
M. S. Valavanides

18:00  SIMULATION OF TRANSIENT FILTRATION PROCESSES IN POROELASTIC MEDIA WITH PHYSICAL NONLINEARITIES  
A. A. Nasedkina

18:20  TRACER MOVEMENTS IN OPPOSITE FLOW DIRECTION UNDER SATURATED CONDITIONS. A NOVAL FINDING IN DISPERSION OPERATIONS BY USING SCHEIDEgger-BEAR’S FORMULA  
M. Nishigaki, P. Renz, C. Hartwig and K. Hagiwara

Friday, July 1st
Parallel Session D2-C5, Room E (IMEL)

Structural dynamics B

Chair: A. A. Stamos, A. F. Vakakis

17:00  NON LINEAR SYSTEM IDENTIFICATION OF VIBROIMPACT DYNAMICS  
M. Kurt, Y. S. Lee, D. M. McFarland, L. A. Bergman and A. F. Vakakis

17:20  A NUMERICAL METHOD FOR PREDICTING ACOUSTICAL WAVE PROPAGATION IN OPEN SPACES  
J. Papageorgakopoulos and S. Tsangaris
17:40  COMPUTATIONAL ACOUSTICAL STUDY OF A CONCERT AND A CONFERENCE HALL  
G. A. Plitsis

18:00  AUTOMATED COST-OPTIMIZED PLACEMENT OF COLUMNS UNDER SEISMIC LOAD  
A. A. Stamos and C. Christias

21:00  Congress Dinner
Saturday, July 2\textsuperscript{nd} 2011

Parallel Session D3-A1, Room B

BEM problems in structural mechanics

Chair: M. S. Neratzaki, G. C. Tsiatas

9:00  A NEW KIRCHHOFF PLATE MODEL BASED ON A MODIFIED COUPLE STRESS THEORY  
G. C. Tsiatas

9:20  AN ENERGETIC APPROACH TO FRICTIONLESS CONTACT PROBLEMS USING THE DIRECT COLOCATION BEM  
C. G. Panagiotopoulos, V. Mantič and I. G. Garcia

9:40  DYNAMIC ANALYSIS OF THIN VISCOELASTIC PLATES OF VARIABLE THICKNESS MODELED WITH FRACTIONAL DERIVATIVES  
N. G. Babouskos and J. T. Katsikadelis

10:00  A MICROSTRUCTURE-DEPENDENT ORTHOTROPIC PLATE MODEL BASED ON A MODIFIED COUPLE STRESS THEORY  
G. C. Tsiatas and A. J. Yiotis

10:20  ANALYSIS OF INHOMOGENEOUS ANISOTROPIC VISCOELASTIC BODIES DESCRIBED WITH FRACTIONAL DIFFERENTIAL CONSTITUTIVE MODELS  
M. S. Nerantzaki and N. G. Babouskos

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Parallel Special Session D3-A2, Room C (IPC)

CFD in rotating machines and their components

Organizers: Prof. J. S. Anagnostopoulos, National Technical Univ. Athens and  
Dr. V. G. Asouti, National Technical Univ. Athens  
Chair: J. S. Anagnostopoulos and V. G. Asouti

9:00  DESIGN OF TURBOMACHINERY BLADINGS USING "T4T"  
G. N. Koini and I. K. Nikolos

9:20  PARTICLE METHODS AND COUPLED PROBLEMS IN ROTORCRAFT AEROMECHANICS  
G. Papadakis and S. Voutsinas

9:40  DESIGN AND COMPUTATIONAL EVALUATION OF S-DUCT INTAKES FOR UAV APPLICATIONS  
F. Papadopoulos, I. Valakos and I. K. Nikolos

10:00  INFLUENCE OF A CIRCULAR EXIT WALL BOUNDARY ON THE AXISYMMETRIC JET FLOW  
A. P. Vouros, M. D. Mentzos, E. I. Xanthopoulos, A. E. Filios and D. P. Margaris
10:20  NUMERICAL STUDY OF THE EFFECT OF SPEAR VALVE DESIGN ON THE FREE JET FLOW
CHARACTERISTICS IN IMPULSE HYDROTURBINES
A. V. Nesiadis, D. E. Papantonis and J. S. Anagnostopoulos

10:40  NUMERICAL COMPUTATION OF THE PERFORMANCE CURVE OF A PELTON TURBINE
USING THE SMOOTHED PARTICLE HYDRODYNAMICS METHOD
P. K. Koukouvinis, J. S. Anagnostopoulos and D. E. Papantonis

11:00  DESIGN OF A HYDROMATRIX TURBINE RUNNER USING AN ASYNCHRONOUS
EVOLUTIONARY ALGORITHM ON A MULTI-PROCESSOR PLATFORM
and P. Grafenberger

Saturday, July 2nd
Parallel Special Session D3-A3, Room D (IMS)

Complex problems in mechanics and engineering
Dedicated to the memory of Prof. Demosthenis I. Bardzokas

Organizers: Prof. K. Hitzanidis, National Technical Univ. Athens, Dr. G. A. Papadopoulos,
National Observatory of Athens and Prof. C. I. Siettos, National Technical Univ. Athens
Chair: K. Hitzanidis, G. A. Papadopoulos, C. I. Siettos

9:00  MULTISCALE CONSIDERATION OF PLASTICITY AND STRESS-STRAIN IN ENGINEERING
MATERIALS (STUDY CASE: ALUMINUM ALLOY)
C. A. Charitidis, D. A. Dragatogiannis and G. Lolas

9:20  UNDERSTANDING TSUNAMI WAVES THROUGH NUMERICAL SIMULATIONS: THE CASE
OF MINOAN TSUNAMI, 17TH CENTURY BC
G. A. Papadopoulos, F. McCoy and T. Novikova

9:40  ANALYSIS OF THE TOPOLOGICAL CHARACTERISTICS OF EARTHQUAKES IN REGIONS OF
THE HELLENIC ARC BASED ON NETWORK THEORY
E. Daskalaki, G. A. Papadopoulos, C. Spiliotis and C. I. Siettos

10:00  PROPAGATION OF A PLANE WAVE TO A MATERIALLY UNIFORM BUT INHOMOGENEOUS
BODY
D. Sfyris

10:20  ELECTROMIGRATION-DRIVEN SURFACE MORPHOLOGICAL EVOLUTION OF
HETEROEPITAXIAL THIN FILMS ON VARIOUS TYPES OF DEFORMABLE SUBSTRATES
G. I. Sfyris and D. Maroudas

10:40  A SYSTEMATIC APPROACH FOR THE COARSE-GRAINED BIFURCATION ANALYSIS OF THE
EFFECT OF SOCIAL NETWORK STRUCTURE ON THE EMERGENT DYNAMICS OF
INDIVIDUAL-BASED STOCHASTIC MODELS
A. I. Reppas, F. Protopapa, K. Spiliotis and C. I. Siettos
A NEW MATHEMATICAL TECHNIQUE IN CONSTRUCTING THE EXACT PARAMETRIC SOLUTIONS OF THE NONLINEAR ODEs OF THE TYPE $y'' = f''(x)y''(y')$. APPLICATION TO THE WHITE-DWARF RELATIVISTIC EQUATION

D. E. Panayotounakos and Th. I. Zarmpoutis

Saturday, July 2nd
Parallel Session D3-A4, Room E (IMEL)

Soil mechanics

Chair: S. Papargyri-Beskou, Y. Tsompanakis

9:00 TRANSIENT DYNAMIC ANALYSIS OF A FLUID-SATURATED POROUS GRADIENT ELASTIC COLUMN
S. Papargyri-Beskou, S. V. Tsinopoulos and D. E. Beskos

9:20 SIMULATING THE DYNAMIC DISTRESS OF PILE FOUNDATIONS
P. N. Psarropoulos, V. Drosos, Y. Tsompanakis and G. Papazafeiropoulos

9:40 QUALITATIVE ANALYSIS OF SIMPLE MODELS CONCERNING THE TRAP-DOOR MECHANISM USING DEM SIMULATION
E. Vairaktaris, I. Stefanou and E. Papamichos

11:40 Coffee Break

12:00 Congress Closing