

IMACS2023

Monday 09/11/2023

PLENARY ROOM #38

11:30 – OPENING

Carlo Massimo Casciola, Dean of the Civil and Industrial Engineering Faculty of the University 'La Sapienza of Rome

Emilio Fortunato Campana, Director of the Department of Engineering, ICT and Energy and Transport Technologies (DIITET) of the National Research Council (CNR)

Roberto Natalini, Director of the Institute for the Applications of Computing (IAC) of CNR

Rosa Maria Spitaleri, President of IMACS and Chair of *IMACS2023*

Thiab Taha, vice-President of IMACS and co-Chair of *IMACS2023*

12:00 - KEYNOTE LECTURE

Chair: *Rosa Maria Spitaleri*

Approximation of Non Linear Hyperbolic Problems and Property of Conservation
Remi Abgrall

12:45 - KEYNOTE LECTURE

Chair: *Ezio Venturino*

Forecasting Damage and Consolidation: Mathematical Models of Reacting Flows in Monumental Stones
Roberto Natalini

13:30 - LUNCH TIME

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PLENARY ROOM #38

15:00 - SS8

NEW TRENDS IN PHASE FIELD: THEORY AND APPLICATIONS

Organizers: *Mejdi Azaiez, Chuanju Xu*

15:00 - Nonlocal Cahn-Hilliard type Model for Image Inpainting
Mejdi Azaiez

15:20 - Monte Carlo fPINNs: Deep learning method for forward and inverse problems involving high dimensional fractional partial differential equations
Ling Guo

15:40 - A diffuse domain method for solving PDEs in complex geometries
Zhenlin Guo

16:00 - A unified design of nonuniform energy stable schemes for time fractional gradient flows and nonlinear integro-differential equations
Ren-jun Qi, Xuan Zhao

16:20 - On operator splitting methods for phase-field equations
Chaoyu Quan

16:40 - Gradient flow models: modeling and numerical methods
Chuanju Xu

17:00 Numerical modelling and optimization for Thermal Energy Storage
Hui Yao

17:20 - SS12

RECENT ADVANCES IN LATTICE BOLTZMANN METHODS

Organizer: *Ralf Deiterding*

17:20 - Non-Cartesian Lattice Boltzmann Methods with Structured Adaptive Mesh Refinement
Ralf Deiterding, Juan Antonio Reyes Barraza

17:40 - Lightweight Lattice Boltzmann
Marco Lauricella

15:00 – SS4

GRAPHICAL MODELS FOR LIFE SCIENCE

Organizers: *Claudia Angelini, Daniela De Canditiis, Italia De Feis*

15:00 - Valid and Exact Two-sample Permutation Tests for Network Data
Cesare Miglioli, Stéphane Guerrier, Maria-Pia Victoria-Feser

15:20 - Structure Learning of Graphical Models for Count Data, with Applications to Single-cell RNA Sequencing
Thi Kim Hue Nguyen, Koen Van Den Berge, Monica Chiogna, Davide Risso

15:40 - Structure Learning of Coloured Gaussian Graphical Models for Paired Data
Alberto Roverato, Saverio Ranciat

16:00 - Empowering Propensity Score Estimation through a Bayesian Network approach
Paola Vicard, Federica Cugnata, Paola M.V. Rancoita, Pier Luigi Conti, Alberto Briganti, Clelia Di Serio, Fulvia Mecatti

16:20 - Random Graphical Model of Microbiome Interactions in Related Environments
Veronica Vinciotti, Ernst Wit, Francisco Richter

16:40 – General Session (1)Chair: *Mapundi Kondwani Banda*

16:40 - Numerical approximations for some fractional stochastic partial differential equations-cases of nonlinear heat and Burgers equations
Zineb Arab, Latifa Debbi

17:00 - An Analysis of Boundary Perturbations in Laplace-Steklov Eigenvalue Problems
Eylem Bahadır, Önder Türk

17:20 - Analysing the Well-posedness of Networked first-order Hyperbolic Systems of Fluid Flow
Mapundi Kondwani Banda

17:40 - Deep Image Prior Based Segmentation for Noisy Images
Alessandro Benfenati, Ambra Catozzi, Giorgia Franchini, Federica Porta

15:00 – SS14

USING BLOCK METHODS FOR SOLVING DIFFERENTIAL PROBLEMS

Organizer: Higinio Ramos

15:00 - Valid and Exact Two-sample Permutation Tests for Network Data
Adaptive stepsize optimized three-step hybrid block method for first-order initial value problems

Aderogba Adebayo, Higinio Ramos

15:20 - An Optimized Algorithm for Numerical Solution of Coupled Burgers Equations

Anurag Kaur, V. Kanwar, Higinio Ramos

15:40 - The Semi-implicit EM Method for Nonlinear Non-autonomous SDEs Driven by a Class of Levy Processes

Xiaotong Li, Wei Liu, Hongjiong Tian

16:00 - Block θ -methods for DAEs and DDAEs

Xiaotong Li, Zhongli Liu, Haiyan Yuan, Hongjiong Tian

16:20 - A New Block Method for Direct Integration of Third-order BVPs

Mufutau Ajani Rufai, Bruno Carpentieri, Higinio Ramos

16:40 – SS1

BIOMEDICINE MEETS NUMERICS: ADVANCED NUMERICAL METHODS FOR NEW CHALLENGES

Organizers: *Cristina Campi, Francesca Pitolli*

16:40 - Mathematical Methods in Medicine

Cristina Campi, Isabella Cama, Valentina Candiani

17:00 - A new TPS for FLASH VHEE beams: the implementation of quantum based algorithms

Angelica De Gregorio, Daniele Carlotti, Gaia Franciosini, Michela Marafini, Annalisa Muscato, Alessio Sarti, Angelo Schiavi, Marco Toppi, Giacomo Traini, Antonio Trigilio, Vincenzo Patera

17:20 - An in-vivo comparison of Electrophysiological Source Imaging methods

Annalisa Pascarella, Ezequiel Mikulan, Federica Sciacchitano, Simone Sarasso, Annalisa Rubino, Ivana Sartori, Francesco Cardinale, Flavia Zauli, Pietro Avanzini, Lino Nobili, Andrea Pigorini, Alberto Sorrentino

17:40 - Advanced Computer Vision Techniques for Drug Abuse Detection

Giulia Tufo, Meriam Zribi, Francesca Pitolli

15:00 – SS11

RECENT ADVANCES IN DATA SCIENCE. COMPUTATIONAL ASPECTS AND APPLICATIONS

Organizer: *Christian Acal*

15:00 - Function-on-function PLS regression: a penalized approach

M. Carmen Aguilera-Morillo, Harold A. Hernandez-Roig, Ana M. Aguilera, Cristian Preda

15:20 - Robust Estimation and Testing for Step-stress Experiments under Interval Censoring

Narayanaswamy Balakrishnan, María Jaenada, Leandro Pardo

15:40 - A Spatial Functional Regression Approach from Correlated Curves in Space

Felicita Doris Miranda Huaynalaya, Maria Dolores Ruiz Medina

16:00 - How to Model a Complex System Subject to Multiple Events and a Vacation Policy in a Matrix-computational Form. MMAPs

Juan Eloy Ruiz-Castro, Hugo Alaín Zapata-Ceballos

16:20 - Wavelet-based Sparse Optimization via Fixed-point Iteration Scheme in High-dimensional Data Analysis

*Marc Vidal, Ana M. Aguilera***16:40 – MS7**

NUMERICAL METHODS FOR FRACTIONAL-DERIVATIVE DIFFERENTIAL EQUATIONS

Organizers: *Roberto Garrappa, Martin Stynes*

16:40 - A Rational Preconditioner for Multi-dimensional Riesz Fractional Diffusion Equations

Lidia Aceto, Mariarosa Mazza

17:00 - Numerical Solution of Random Fractional Laguerre-type Differential Equations via Moments and Density

Clara Burgos Simón, Juan Carlos Cortés López, Laura Villafuerte Altúzar, Rafael J. Vilanueva Micó

17:20 - Two Kinds of Numerical Algorithms for Ultra-slow Diffusion Equations

Min Cai, Changpin Li, Yu Wang

17:40 - A Computational Approach for Variable-order Fractional Differential Equations

Roberto Garrappa, Andrea Giusti

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Chiostro

18:00 – POSTER SESSION

Chair: *Bharat K. Soni*

Randomized GSVD based regularization for the inverse problem of ultrasound tomography

Anita Carević, Mohamed Almekkawy

Approximating inter-arrival distribution by phase type distribution.
Asymmetric kernel method

Yasmina Djabali

Observer-based Dissipativity of Parabolic Systems with Multiple Actuators and Time Delays

Ragul Ravi, Kalidass Mathiyalagan, Ju H. Pa