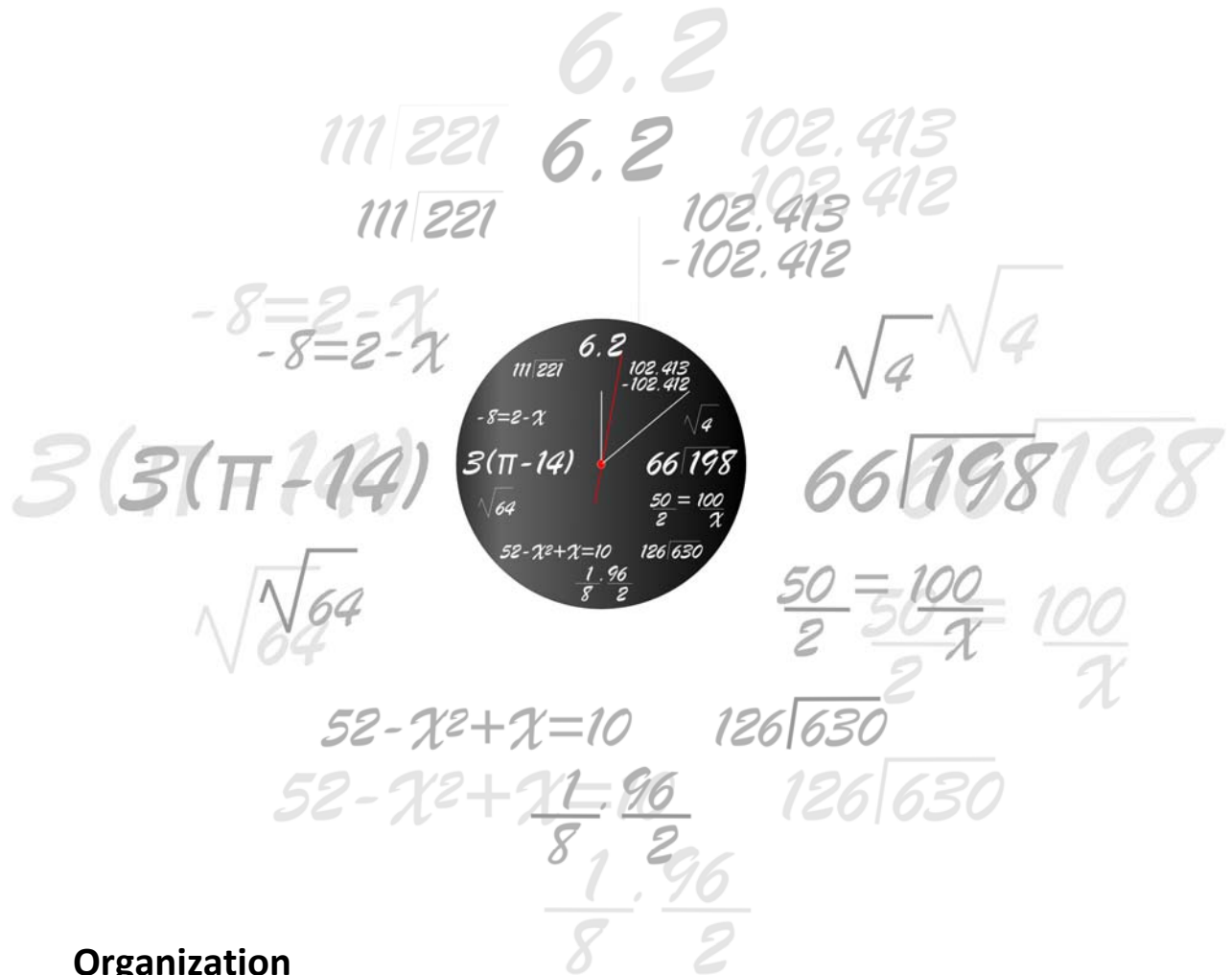




Instituto Politécnico de Coimbra

Final Program



Organization



INSTITUTO
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Welcome Venue

We welcome you to the 3rd Conference in Mathematical Methods in Engineering, 2010. The conference is intended to be an international forum where an effective exchange of knowledge and experience amongst researchers active in various theoretical and applied areas of mathematics and engineering can take place. Participation of engineers and other scientists from industry is particularly welcome.

After a review process by the International Program Committee, 90 papers were selected to be presented involving authors from 20 countries. Furthermore, five plenary talks by known leading specialists have been programmed for the four days of the conference. This confirms that Mathematical Methods in Engineering has become an important issue for the international scientific community in various fields, such as math tools, biomechanics, modelling, numerical methods, physics, electricity, economics, control theory, fractional calculus and signal processing. This growing activity on Mathematical Methods in Engineering, both from university and industry, supposes a success for this international event gathering and unifying the whole community.

The conference is held in Coimbra, from 21 to 24 October 2010. This event is organized in cooperation with IPC - Polytechnic Institute of Coimbra - and ISEC - Institute of Engineering of Coimbra. Our host city, Coimbra, is located in central Portugal, 40 km east of the mouth of Mondego river, 195 km north of Lisbon, the Portuguese capital, and 120 km south of Porto, the second Portuguese city. Coimbra was the first capital of Portugal, founded in 1143 by King Afonso Henriques, the first King of Portugal. Having ceased to serve as the capital of Portugal in the 13th century, Coimbra has nevertheless retained considerable importance as the capital of the former Beira province, now designated the Centro region. It is considered the most important city of Portugal outside the Lisbon and Porto Metropolitan Areas, playing a role as the chief city of the whole central area of the country. With a dense urban grid the city of Coimbra is famous for its monuments, churches, libraries, museums, parks, nightlife, healthcare and shopping facilities, but above all for its intense cultural life, centered on the University of Coimbra, one of the oldest universities in Europe. This relevance within the context of the country's cultural life can be seen in the large number of writers, artists and academics connected with the city, which has thus secured throughout its history a reputation as the *Lusa Atenas* (Lusitanian Athens).

We would like to express our gratitude to the International Program Committee, to all the referees, to the invited plenary speakers, to the symposia organizers and to the authors of all papers. We would also like to thank the supporting institutions that allowed the organization of the workshop in the best conditions.

We are very pleased to welcome you to 3rd Conference in Mathematical Methods in Engineering, 2010 and to wish you a pleasant and enjoyable stay in Coimbra and in Portugal.

International Program Committee

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Rudas, I., Hungary
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Invited lectures

Tenreiro Machado, J. A., Portugal
Miranda Dias, J. M., Portugal
Baleanu, D., Turkey
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Zdenek, P. Bazant, USA
Agrawal, Om. P., USA

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Organizing Institution

ISEC – Instituto Superior de Engenharia de Coimbra

Supporting Institutions

ISEC – Instituto Superior de Engenharia de Coimbra
IPC – Instituto Politécnico de Coimbra

Venue Location

The symposium will be held at the ISEC.

As a dynamic engineering institute committed to continuous and constant improvement of its services, Coimbra Institute of Engineering is determined to create an atmosphere that will be more than just a learning experience for its students. Its major concerns are to encourage and inspire students to develop their research and creative skills, as well as to cultivate critically-minded and professionally motivated individuals.

Given these goals, the Institute therefore focuses on providing high-quality education that combines a strong practical component with a solid theoretical background. Furthermore and likewise, it is our prime concern that our degrees and content material taught throughout the courses meet the requirements and needs of the work environment and the new realities of today's world.

Coimbra Institute of Engineering includes the following departments:

- Biological And Chemical Engineering (DEQB);
- Civil Engineering (DEC);
- Computer Science and Systems Engineering (DEIS);
- Electrotechnics Engineering (DEE);
- Mathematics and Physics (DFM)
- Mechanical Engineering (DEM).

Contacts

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Fax : + 351 239 790 201
- E-mail: info@isec.pt





GPS: N 40 11.575 W 8 24.698

ISEC Campus Map



The conference rooms are located on Auditorium and Mechanical Engineering Department. The registration desk is at Auditorium.

How to get to Coimbra

By plane:

The most convenient airports to Coimbra (in order of distance) are:

Francisco Sá Carneiro Aeroporto - Porto

Portela Aeroporto - Lisboa

Distance:

121 km from Porto

208 km from Lisbon

By train:

All trains that make stops from Porto and Lisbon stop in Coimbra; close to an hour leaving from Porto and about an hour and forty-five minutes leaving from Lisbon. Long distance trips depart from Coimbra B (outside the city centre). The train schedules are accessible at www.cp.pt

By car:

The best way to get to Coimbra is to take the highway A1. Take any exit towards Coimbra and this will bring you ten minutes to the city centre.

By bus:

To see the bus schedule log onto the bus website www.rede-expressos.pt

About one hour from Porto

About two hours from Lisbon

Within the city:

The city has an excellent network of buses through the Municipal Services of Coimbra Urban Transportation. These buses are the best within the city transport system, including modern buses as well as well as Trolley cars. To get to know the lines better, visit <http://www.smtuc.pt>

Social Program

The normal registration fee for the Conference already includes the Cultural Tour on the afternoon of October 23, 2010 and the Dinner Banquet on the evening of October 22, 2010. Information on the time and place to get the bus to participate on the Cultural Tour and on the Dinner Banquet will be available to the participants at the Registration Desk.

Extra tickets to the Dinner Banquet and Cultural Tour on the afternoon and evening of 22 and 23 October, 2010 can be bought for accompanying persons. The fee is 100 Euros.

Aliança Underground Museum



Prestigious art collector Joe Berardo has created Aliança Underground Museum in Aliança Wines of Portugal Wine Cellars in Sangalhos. This underground museum presents 7 different art collections.

Web: <http://www.alianca.pt/default.htm>

The Forest and Palace of Buçaco



For centuries, the beautiful forest of Buçaco, verdant woods on the side of a hill, was a monastic retreat. The Carmelite monks lived a life of seclusion inside the walled-off forest, and no women were allowed inside by papal decree. This was intended to keep the monks from temptation.

The legacy of these centuries is still apparent: at different points in the forest are small, secluded one-room structures called hermitages, where monks could go to be alone and meditate, as well as numerous fountains, small waterfalls and secret grottoes. During the Age of Discovery, Portuguese sailors and navigators brought back plants and trees from around the world, and today you can still enjoy them: look for species such as Mexican cedars and South American tree palms.

In 1810, the area around Buçaco was the scene of a great battle between French Napoleonic invaders and a combined British-Portuguese force under the Duke of Wellington. The invaders were decisively repelled in spite of superior numbers, and were eventually driven from Portugal.

The forest brings many visitors: highlights include the Fonte Fria, a beautiful fountain and stone staircase, and Cruz Alta, where you can have a great view of the surrounding area. It is also worth it to check out the old walls and gates that surround the monk's forest: the "Coimbra Gate" even features a marble reproduction of the papal bulls that protected the forest and kept the women out! There are numerous walking trails through the forest, and you can get a map of them at the Palace.

The Buçaco Palace was commissioned in 1888 by King Carlos of Portugal as a hunting retreat. The palace is rather small when compared to the palaces of Pena or Queluz, but nevertheless stunning. Ironically, it was only used once, by Carlos' son Manuel II, before the Portuguese Royal family had to skedaddle in 1910. Manuel II was not hunting traditional game: he used the palace to shack up with French actress and dancer Gaby Deslys, with whom he was infatuated (his reckless spending on her is considered by some to be one cause of the Portuguese people rising up against him).

The Palace, a pretty impressive hunting retreat by any standard, is a fairy-tale collection of stone arches, tile murals, marble walls, rich furniture, beautiful gardens and towers. Some of the impressive tile murals depict scenes from the battle of Buçaco.

Since the end of the First World War, the Palace has been a luxury hotel, drawing well-heeled visitors from around the world. Staying at the Palace is an expensive proposition, but even if you can't afford it, you should go see it and wander its elegant corridors and gardens, and maybe even spring for a meal or snack there.

Conference Program

Time	Thursday, 21th October	Friday, 22th October	Saturday, 23th October	Sunday, 24th October
09:30 – 10:30	Welcome Session	Plenary Session 2	Plenary Session 4	Plenary Session 5
10:30 – 11:30	Plenary Session 1	Oral Session 5 A5, B5, C5	Oral Session 9 A9, B9, C9	Closing session
11:30 – 11:45	Break	Coffee Break	Coffee Break	Coffee Break
11:45 – 13:00	Oral Session 1 A1, B1	Oral Session 6 A6, B6	Oral Session 10 A10, B10	
13:00 – 14:30	Lunch	Lunch	Lunch	
14:30 – 15:30	Oral Session 2 A2, B2	Oral Session 7 A7, B7, C7	Cultural Tour	
15:30 – 16:30	Oral Session 3 A3, B3	Plenary Session 3	Cultural Tour	
16:30 – 16:45	Coffee Break	Coffee Break	Cultural Tour	
16:45 – 17:30	Oral Session 4 A4, B4	Oral Session 8 A8, B8	Cultural Tour	

Thursday, 21th October

09:30 – 10:30 – WELCOME SESSION at Auditorium

10:30 – 11:30 – PLENARY SESSION 1 at Auditorium

“Scaling of Probabilistic Quasibrittle Structure Strength and Lifetime: Unified Nano-Mechanical Fracture Theory”

Pof. Zdeněk P. Bažant

Northwestern University, USA

11:30 – 11:45 – Coffee Break

11:45 – 13:00 - Oral Session **B1 – Biomechanics** at Amphitheatre II

Chairman: Cândida Malça

Co-chairman: Ivanka Veneva

Paper 39 - Adaptive System for Control of Active Ankle-Foot Orthosis and Gait Analysis, *Ivanka Veneva*

Paper 66 - Can people with high physical movement restrictions access to any computer? - The CaNWII tool -, *Nuno Rodrigues*

Paper 14 - Biological Pest Control Strategies for Efficient and Sustainable Sugarcane Production, *Marat Rafikov*

Paper 60 - Human Lower Member Trajectory Modeling and Analysis, *João M. Rosário*

11:45 – 13:00 - Oral Session **A1 – Math Tools** at Amphitheatre I

Chairman: João Cardoso

Co-chairman: *Fernando Martins*

Paper 1 - Direct Search Methods for Nonlinear Optimization, *Aldina Correia*

Paper 7 - A fast algorithm realizing the Hermite interpolation, *Lamine Melkemi*

Paper 21 - Cardinal Functions of the Hyperspace with the Locally Finite Topology, *Zhang Meili*

Paper 93 - Descartes' rule of signs and linear programming, *Carla Fidalgo*

13:00 – 14:30 - Lunch

14:30 – 15:30 - Oral Session **A2 – Modeling** at Amphitheatre I

Chairman: Victor Santos

Co-chairman: I-Shih Liu

Paper 22 - Numerical approximation for finite deformation - Bending of a rectangular block, *I-Shih Liu*

Paper 28 –Modelling codfish drying: Comparison between Artificial Neural Network, diffusive and semiempirical models, *CN Boeri*

Paper 69 - A Hybrid MoM/FEM Method for Calculating Shielding Effectiveness of Rectangular Enclosures with Apertures, *Sibel Yenikaya*

Paper 57 - Stability Analysis Of Elastic Plates Under Non-Uniform Stress Fields By the Boundary Element Method, *Paulo Marques Doval*

14:30 – 15:30 - Oral Session **B2 – Numerical Methods** at Amphitheatre II

Chairman: Carla Fidalgo

Co-chairman: João Branco

Paper 5 - Evaluating derivatives of experimental data using smoothing splines, *Brenden Epps*

Paper 8 – Mathematical programming weighting coefficients method in engineering, *Feruccio Bilich*

Paper 12 – Centre scheme for compressible two-phase flow models containing non-conservative products, *Zhao Guiping*

15:30 – 16:30 - Oral Session **A3 – Fractional Calculus** at Amphitheatre I

Chairman: Manuel Ortigueira

Co-chairman: Richard L. Magin

Paper 67 – Fractional Lower Order Moments in NMR: A New Measure of Tissue Complexity, *Richard L. Magin*

Paper 77 - Singular fractional linear systems, *Tadeusz Kaczorek*

Paper 91 - Series Solutions Technique for a Class of Fractional Differential Equations, *Om Agrawal*

15:30 – 16:30- Oral Session **B3 – Math Tools** at Amphitheatre II

Chairman: João Cardoso

Co-chairman: Mariana Marcokova

Paper 25 – General Inhomogeneous Discrete Linear Partial Differential Equations with Constant Coefficients on the Whole Spaces, *L. P. Castro*

Paper 62 - Oversampled Scalogram-based Multiresolution, *Nicolas Grignard*

Paper 71 - On Jacobi Polynomials and Related Functions, *Mariana Marcokova*

16:30 – 16:45 - Coffee Break

16:45 – 17:30- Oral Session **A4 – Numerical Methods** at Amphitheatre I

Chairman: Suhua Wei

Co-chairman: Carla Fidalgo

Paper 27 - Using Hilbert-Huang Transform (HHT) to Access Sympathovagal Balance (SVB), *Rui Fonseca-Pinto*

Paper 37 – Total Variation Approach to Density Reconstruction From X-Ray Radiograph Tomography, *Suhua Wei*

Paper 48 - Error and Stability Analysis of Heat Equation in One Dimension, *Raghavendran*

Paper 94 – Multidimensional Markov Chains Usage in the Radio Resource Management Problem, *Victor Santos*

16:45 – 17:30 - Oral Session **B4 -Manufacturing** at Amphitheatre II

Chairman: Andrea Paoli

Co-chairman: Micael Couceiro

Paper 13 - A manufacturing scheduling approach by combining simulation technique with the Hodgson's algorithm, *Leonilde Varela*

Paper 80 - Manufacturing Scheduling Methods, Approaches and Systems Survey, *Leonilde Varela*

Paper 2 - Mathematical modeling for software-in-the loop prototyping of automated manufacturing systems, *Andrea Paoli*

Friday, 22th October

09:30 – 10:30 – PLENARY SESSION 2 at Auditorium

“A Numerical Scheme for Fractional Variational Problems with One End Point Lying on a Curve”

Prof. Om Agrawal

Mechanical Engineering Southern Illinois University

10:30 – 11:30 - Oral Session **A5– Motor Control and Human Movement** at Amphitheatre I

Chairman: Cândida Malça

Co-chairman: M. A. Castro

Paper 73 - Inter-joint coordination of basketball players during an inciting event of ankle sprain, *M. A. Castro*

Paper 76 - Biomechanical Analysis of an Inciting Event of Ankle Sprain in Basketball Players, *M. A. Castro*

Paper 88 - Time-motion analysis method to study people interaction in human movement science, *Ricardo Duarte*

10:30 – 11:30- Oral Session **B5– Fractional Calculus** at Amphitheatre II

Chairman: Carla Pinto

Co-chairman: Eduardo Solteiro Pires

Paper 17 – Fractional Particle Swarm Optimization, *Eduardo Solteiro Pires*

Paper 47 – Complex order van der Pol Oscillator, *Carla Pinto*

Paper 61 - Intelligent Maintenance of Linear Systems: A Fractional Order Identification Approach, *Ricardo Enrique Gutierrez Carvajal*

Paper 81 –Rational Approximation of Fractional Order SISO System using Squared Magnitude Function, Munmun Khanra

10:30 – 11:30- Oral Session **C5 – Electrical Engineering** at Auditorium

Chairman: Solteiro Pires

Co-chairman: Cristina Faustino

Paper 31 – On the Generation of Reference Solutions for Complex Electromagnetic Problems, *Levent Sevgi*

Paper 20 - An advanced mathematical approach to the nanoelectronic device modeling, *Juan Roldán*

Paper 75 - About Modeling and Simulation methods of the 400 kV unloaded line switching, *P. Tusaliu*

11:30 – 11:45 – Coffee Break

11:45 – 13:00 - Oral Session **A6 – Control** at Amphitheatre I

Chairman: Jozsef K. Tar

Co-chairman: Toader Adrian

Paper 4 - New approach for Stabilization by Output Feedback in Descriptor Systems, *Elmer Rolando Llanos*

Paper 36 – A new subspace closed loop identification, *Santos D. Miranda Borjas*

Paper 74 – A Generally Valid Algorithm for PID Auto-Tuners, *Clara Ionescu*

Paper 78 -From limits of human pilot mathematical, *Toader Adrian*

Paper 29 - Stability of Matrix Differential Equations with commuting Matrix Constant Coefficients, *Fernando Martins*

11:45 – 13:00 - Oral Session **B6 - Robotics** –at Amphitheatre II

Chairman: Miguel Lima

Co-chairman: Micael Couceiro

Paper 23- The Concept of Robot Society: Evidence Taken From Multi-Robot SLAM, *Micael Couceiro*

Paper 30 - A Statistical Approach for Tuning the Windowed Fourier transform, *Miguel Lima*

Paper 33 - Fuzzy-PI Force Control for Industrial Robotics, *Nuno Mendes*

Paper 55 - A Genetic algorithm for the Optimization of Quadruped Robot Parameters, *Manuel Silva*

13:00 – 14:30 – Lunch

14:30 – 15:30 - Oral Session **A7– Modeling** at Amphitheatre I

Chairman: Cândida Malça

Co-chairman: Micael Couceiro

Paper 58 – Analysis of the Wind Influence in Tennis Serve, *Pedro Mendes*

Paper 70 - Chain Drives Modelling Using Kinematic Constraints, *Cândida Malça*

Paper 35 – Mathematical Modeling of Heat and Mass Transfer in domain of solidifying Alloy, *Bohdan Mochnecki*

14:30 – 15:30 - Oral Session **B7- Signal Processing** at Amphitheatre II

Chairman: Manuel D. Ortigueira

Co-chairman: João Cardoso

Paper 82 - On a not so Fast Fourier Transform, *Manuel D. Ortigueira*

Paper 83 - Higher–order iterative methods for pth roots of complex numbers, *João Cardoso*

Paper 9 - 2.5D Acoustic Wave Propagation in Shallow Water over an Irregular Seabed Using the Boundary Element Method, *A.Pereira*

14:30 – 15:30 - Oral Session **C7– Motor Control and Human Movement** at Auditorium

Chairman: Filipe Melo

Co-chairman: Rui Mendes

Paper 24 – Visual Detection and Estimation of Golf Putting, *Gonçalo Dias*

Paper 89 - Mathematical and Statistical concepts applied to Health and Motor Control, *Filipe Melo*

Paper 92 - A method for segmented-trend estimate and geometric error analysis in motor learning, *Rui Mendes*

15:30 – 16:30 – PLENARY SESSION 3 at Auditorium

“Towards Replacing Lyapunov’s “Direct” Method in Adaptive Control of Nonlinear Systems”

Prof. Jozsef K. Tar

Institute of Intelligent Engineering Systems, O’buda University, Budapest, Hungary

16:30 – 16:45 - Coffee Break

16:45 – 17:30 - Oral Session **A8– Math Tools** at Amphitheatre I

Chairman: Okan Gercek

Co-chairman: Fernanda A.Ferreira

Paper 72 - On Multipoint Nonlocal Elliptic-Parabolic Problems, *Okan Gercek*

Paper 51 - Finite Difference Method For Multidimensional Elliptic Equations With Bitsadze-Samarskii-Neumann Conditions, *Fatma Songül Özeseñli Tetikoglu*

Paper 52 - Stackelberg model with incomplete information, *Fernanda A.Ferreira*

Paper 53 - The transform of the topological structure of the huge heavy loading gripper device and its optimization, *Jingfei He*

16:45 – 17:30 - Oral Session **B8 – Modeling** at Amphitheatre II

Chairman: Jozsef K. Tar

Co-chairman: *Ewa Majchrzak*

Paper 34 - Identification of Material Thermophysical Parameters with Regard to Optimum Location of Sensors, *Ewa Majchrzak*

Paper 54 – Reachability of linear hybrid systems, *Krzysztof Rogowski*

Paper 41 - Schemes and Applications of Numerical Synchronization Control in Multi-Pole Table-Lift, *Liu Chaoying*

20.30 – Banquet Dinner

Location: Best Western D. Luis

Saturday, 23th October

09:30 – 10:30 – PLENARY SESSION 4 at Auditorium

"Probabilistic Approaches for Artificial Robotic Perception"

Prof. Jorge Miranda Dias

Institute Systems & Robotics University of Coimbra

10:30 – 11:30 - Oral Session **A9 – Economy** at Amphitheatre I

Chairman: Maria Cristina Canavarro Teixeira

Co-chairman: Rui Gonçalves

Paper 65 – Optimal Life Insurance, Consumption and Investment Decisions, *Isabel da Silva Duarte*

Paper 79 – Universality in IGBM returns fluctuations, *Rui Gonçalves*

Paper 85 - Hedonic Methodologies in the Real Estate, *Maria Cristina Canavarro Teixeira*

10:30 – 11:30 - Oral Session **B9 – Numerical Methods** at Amphitheatre II

Chairman: *Nuria Reguera*

Co-chairman: Suhua Wei

Paper 15 – Long Time Numerical Approximation of Coherent-structure Solutions of the Cubic Schrödinger Equation, *Nuria Reguera*

Paper 38 – The Improvement of Total Variation Based Image Restoration Method and Its Application, *Suhua Wei*

Paper 45 – A note on the numerical solution of Fractional Schrödinger Differential Equations, *Betul Topcu*

10:30 – 11:30 - Oral Session **C9 – Electrical Engineering** at Auditorium

Chairman: Cristina Faustino

Co-chairman: Branislav Dobrucky

Paper 10 - Using Theory of Series for Distortion Determination of non-harmonic Quantities of Power Electronic Systems, *Branislav Dobrucky*

Paper 26 –Generalized State-Space Modeling for m Level Diode-Clamped Multilevel Converters, *Miguel Chaves*

Paper 63 - The Rough Set Theory Applied to an Incomplete Information System, *Faustino Agreira*

11:30 – 11:45 – Coffee Break

11:45 – 13:00 - Oral Session **A10– Algorithms** at Amphitheatre I

Chairman: Manuel D. Ortigueira

Co-chairman: João Cardoso

Paper 6 - New Parallel Matrix Multiplication Algorithms for Wormhole-Routed All-Port 2D/3D Torus Networks, *Cesur Baransel*

Paper 19 - Smoothing the Polyhedral Mesh Surface with Nagata Interpolations, *D.M. Neto*

Paper 44 - Evaluate Computational Complexity of Multigrid Preconditioner for Hierarchical Triangular, *Amir Ranjbar*

11:45 – 13:00 - Oral Session **B10– Math Tools** at Amphitheatre II

Chairman: João Cardoso

Co-chairman: Zeynep Odemis

Paper 32 – On a Asymptotic Behaviour of the Solution for a Stochastic Coupled System of Reaction-Diffusion of Nonlocal Type, *Jorge Ferreira*

Paper 40 – Green’s Functions for the Wave, Helmholtz and Poisson Equations in a Two-Dimensional Boundless Domain, *Roberto Toscano Couto*

Paper 43 – Vector Ellipsoidal Harmonics: Structure Peculiarities and Limitations, *George Dassios*

Paper 59 – Linear Codes Over Z_2^s With The Extended Lee Weight, *Zeynep Odemis*

13:00 – 14:30 – Lunch

14:30 – 17:30 - Cultural Tour

Aliança Underground Museum

Forest and Palace of Buçaco

Sunday, 24th October

09:30 – 10:30 – PLENARY SESSION 5 at Auditorium

“New trends in fractional dynamics”

Prof. Baleanu Dumitru

Department of Mathematics and Computer Sciences, Cankaya University, Ankara, Turkey

10:30 – 11:30 – CLOSING SESSION at Auditorium