Dual Priority Scheduling algorithm used in the nMPRA Microcontrollers

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SINAIA 2014

Contents

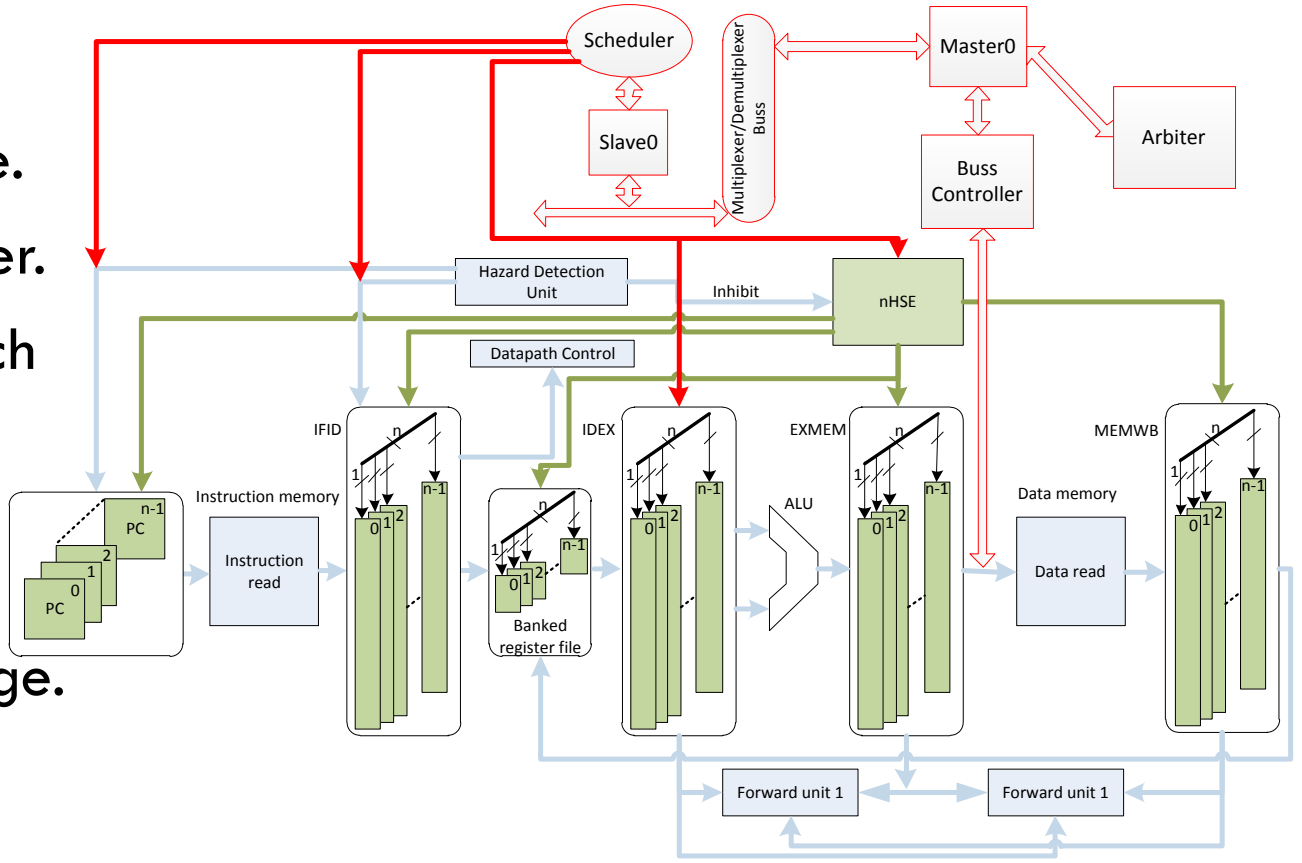
1. Why?

- The use of a single scheduling algorithm can lead to the following problems:
  - most of the real time operating systems are certified for tasks that are much pessimistic that the designer will thought.
  - In the automotive field, the non-preemptive schedulers are used where the system is safety relevant. The adoption of this strategy is used because offers a high predictability to the system, but can lead the system into failure.

2. Overview(1)

The nMPRA architecture.

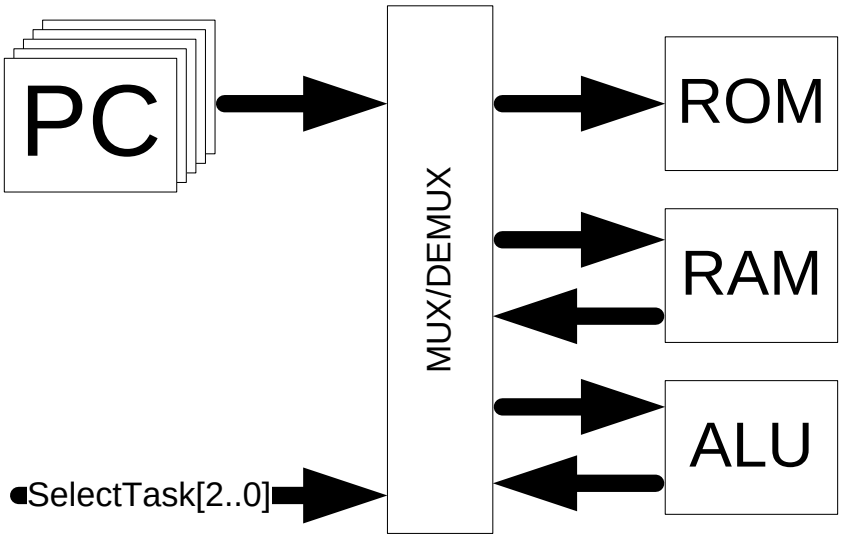
- PC – program counter.
- IFID – Instruction Fetch Instruction Decode stage.
- ID/EX – Instruction decode–execute stage.
- EX/MEM – execute-memory stage.
- MEM/WB – memory-write back stage.



2. Overview(2)

The simplified nMPRA architecture.

- The RAM, ALU and ROM are shared between multiple resources using only one big multiplexer/demultiplexer.
- Each task will share only RAM, ALU, ROM. The register file and the program counter will be multiplied. This approach will ensure that the data will be remain valid after every task switch.



3. Dual priority algorithm (1)

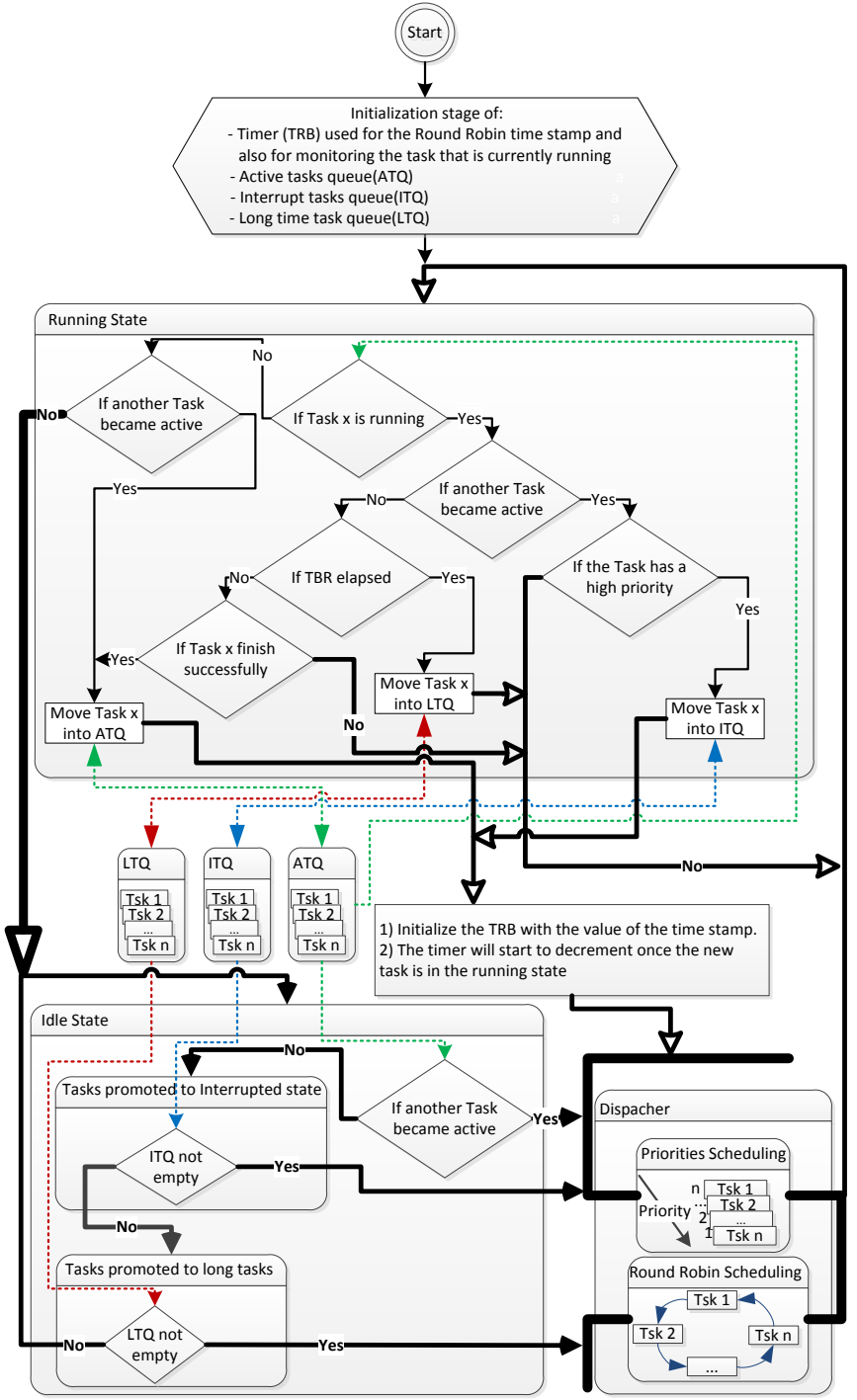
Classes that each task can belong to the dynamic dual priority algorithm :

- The class of active tasks, which has the higher priority (the tasks will be inserted only in the active task queue (ATQ)) will schedule the tasks, based on priorities, only in the Running State (RS) of the Scheduler.
- The class of interrupted tasks, which has the second priority (the tasks will be inserted only in the interrupted task queue (ITQ)) will schedule the tasks, based on priorities, only in the Idle State (IS) of the Scheduler.

3. Dual priority algorithm (2)

- The long execution tasks class (significantly exceed the base period T corresponding to the priority task), which has the least priorities (LTQ): will schedule the tasks, based on ROUND ROBIN (RR) algorithm, only in the Idle State (IS) of the Scheduler.

- ATQ-active task queue.
- ITQ-interrupted task queue.
- LTQ-long task queue.
- TRB-timer Round Robin used to supervise the active time of the current task and also used as a task occurrence for the long tasks.
- Running State-processor execute code.
- Idle State-the processor finishes the execution of code.

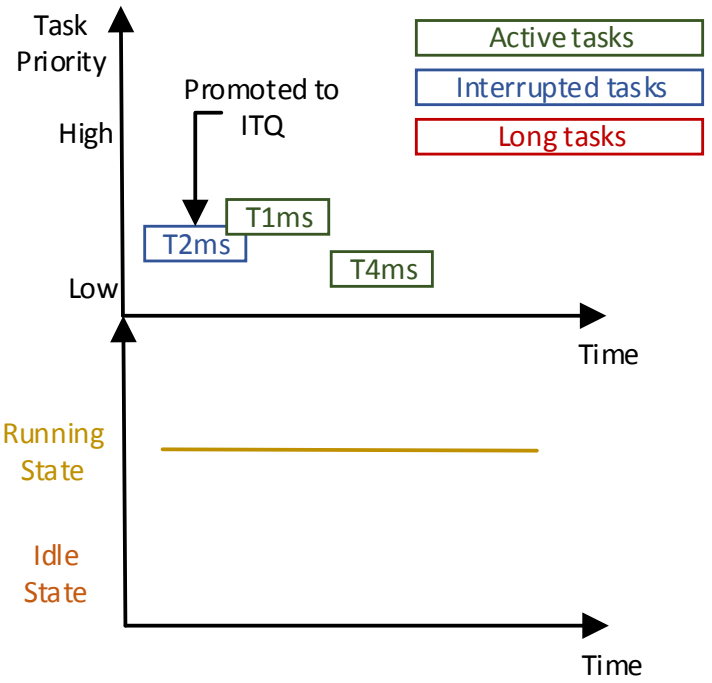


3. Dual priority algorithm (3)

- If the TRB and the occurrence of the tasks are not chosen properly, the following situation can occur:
  - Priority inversion.
  - Task starvation.

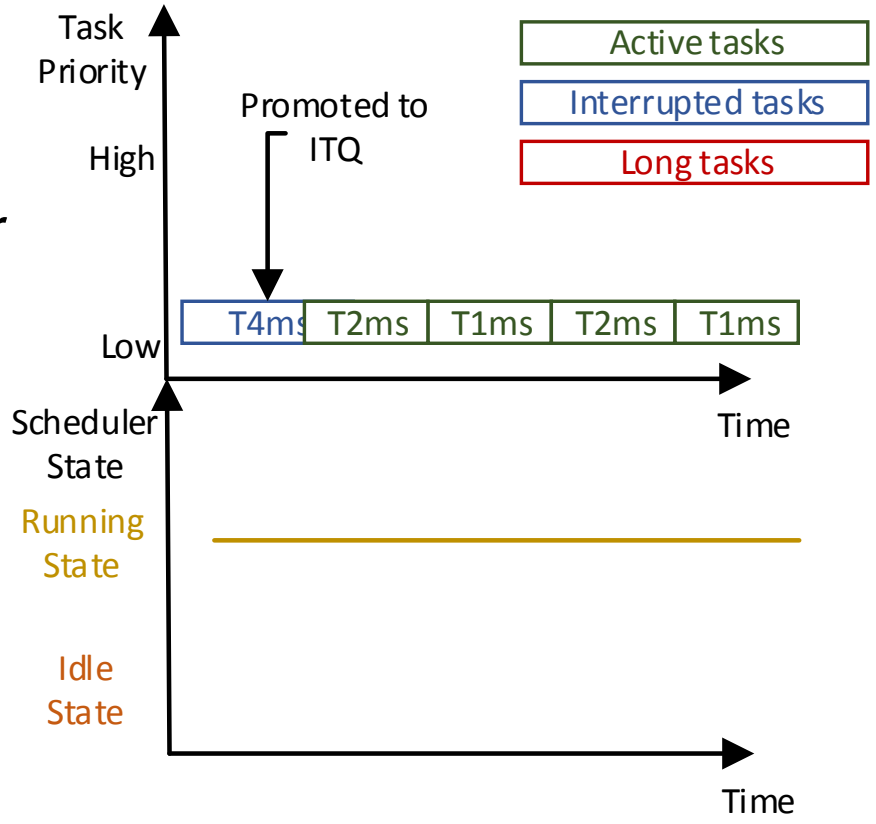
3. Dual priority algorithm (4)

- Priority inversion: There are 3 tasks with different priorities. The task, with intermediary priority, is running and is interrupted by the second task with higher priority. The task that was interrupted is now in the ITQ and the current task finishes its execution, but at the same time, the third task, with lower priority became active. In this particularly case the task from ITQ will not run, even though it has higher priority, because the new task is located into the ATQ.



3. Dual priority algorithm (5)

- Task starvation: Assume that we have 3 tasks with different recurrence and same priorities. If one task is interrupted by another task, with higher priority, this task will be introduced into the ITQ. From this point forward all of the tasks are going to succeed properly forcing the Scheduler to remain in the RS. Because the ITQ and LTQ are used only in the IS, this task will starve.



3. Dual priority algorithm (6)

- If these two requirements are not met, the scheduler will not work properly because one of the two unfortunate situations, explained above, will happen. This situation is not a consequence of the scheduling algorithm being implemented in hardware, the same situation could happened to a scheduling algorithm implemented in software.
- If the system is overloaded with tasks the system can be configured to work only in a Round Robin manner, each task will have the same occurrence.

4. Conclusions(4)

- The algorithm presented will ensure the execution of each task, even for those states that are different from normal state, only if the occurrence of the tasks and the time for the TRB is chosen properly.
- The nMPRA microcontroller provides very good switching time, constant 5 machine cycles.
- Reduce the comsuption of memory of the Operating System(ROM, RAM).

5. References

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Proceedings of
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October 17 - 19, 2014

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18th International Conference on System Theory, Control and Computing

October 17-19, 2014, Sinaia, Romania

Program at a Glance

ICSTCC 2014 Technical Program Friday October 17, 2014 Friday Saturday Sunday

ICSTCC 2014 Technical Program Friday October 17, 2014				
Track T1	Track T2	Track T3	Track T4	Track T5
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09:20-10:05 Miorita Plenary Session FrPP1 *Perspectives on Software Integration for Intelligent Robotic Systems*				
10:05-10:50 Miorita Plenary Session FrPP2 *Visual Data Understanding and UI Control with Humans in the Loop*				
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15:00-15:50 Miorita Plenary Session FrPP3 *How to Cluster Data: Algorithms and Validation*				
16:10-18:10 Miorita Invited Session FrB1 *New Trends in Robotic Systems*	16:10-18:10 Ara Invited Session FrB2 *Real Time Systems Applications*	16:10-18:10 Carpati Regular Session FrB3 *Applied Informatics*	16:10-18:10 Laca Regular Session FrB4 *Control Applications*	16:10-18:10 Bucegi 1 Regular Session FrB5 *Nonlinear Systems*

ICSTCC 2014 Technical Program Saturday October 18, 2014 Friday Saturday Sunday Top

ICSTCC 2014 Technical Program Saturday October 18, 2014				
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09:00-09:45 Miorita Plenary Session SaPP4 *Developing the Industrial Internet of Things with a Network Centric Approach*				
09:45-10:30 Miorita Plenary Session SaPP5 *Intelligent Cyber - Energy Systems*				
10:50-12:50 Miorita Invited Session SaC1 *Bio-Inspired Dynamical Systems*	10:50-12:50 Ara Regular Session SaC2 *Predictive Control*	10:50-12:50 Carpati Regular Session SaC3 *Robust Control*	10:50-12:50 Laca Regular Session SaC4 *Distributed Systems and Web Applications*	10:50-12:50 Bucegi 1 Invited Session SaC5 *Interactions in Complex Systems*
15:00-16:40 Miorita Invited Session SaD1 *Advances in Automotive Control - I*	15:00-16:40 Ara Invited Session SaD2 *Visual Computing - I*	15:00-16:40 Carpati Regular Session SaD3 *Embedded Systems*	15:00-16:40 Laca Regular Session SaD4 *Control System Design*	15:00-16:40 Bucegi 1 Regular Session SaD5 *Hybrid and Discrete Event Systems*
17:00-18:40 Miorita Invited Session SaE1 *Advances in Automotive Control - II*	17:00-18:40 Ara Invited Session SaE2 *Visual Computing - II*	17:00-18:40 Carpati Regular Session SaE3 *Identification, Modelling and Simulation*	17:00-18:40 Laca Regular Session SaE4 *Theory of Algorithms*	17:00-18:40 Bucegi 1 Regular Session SaE5 *Agent-Based Systems*

ICSTCC 2014 Technical Program Sunday October 19, 2014				
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12:30-13:00 Miorita Plenary Session SuPCC *Closing Ceremony*				

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Technical Program for Friday October 17, 2014

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FrPOC Plenary Session, Miorita

Opening Ceremony

Chair: Voicu, Mihail — Gheorghe Asachi Tech. Univ. of Iasi
Co-Chair: Rasvan, Vladimir — Univ. of Craiova

FrPP1 Plenary Session, Miorita

Perspectives on Software Integration for Intelligent Robotic Systems

Cervera, Enric — Jaume-I Univ. of Castello de la Plana

Chair: Rasvan, Vladimir — Univ. of Craiova

FrPP2 Plenary Session, Miorita

Visual Data Understanding and UI Control with Humans in the Loop

Charvillat, Vincent — Univ. of Toulouse

Chair: Lazar, Corneliu — Gheorghe Asachi Tech. Univ. of Iasi

FrPP3 Plenary Session, Miorita

How to Cluster Data: Algorithms and Validation

Fränti, Pasi — Univ. of Eastern Finland

Chair: Minzu, Viorel — Dunarea de Jos Univ. of Galati

FrA1 Regular Session, Miorita

Linear Systems

Chair: Oara, Cristian — Pol. Univ. of Bucharest
Co-Chair: Pastravanu, Octavian-Cezar — Gheorghe Asachi Tech. Univ. of Iasi

11:10-11:30, Paper FrA1.1

On a Conjecture in Stability Analysis of Polytopic Systems – Mimicking Spectral Radius Properties from Real to Complex Matrices

Pastravanu, Octavian-Cezar — Gheorghe Asachi Tech. Univ. of Iasi
Matcovschi, Mihaela-Hanako — Gheorghe Asachi Tech. Univ. of Iasi

11:30-11:50, Paper FrA1.2

Study of the Interaction between a One Degree of Freedom Force Augmenting Device and a Human Operator

Gadi, Suresh Kumar — Pol. Univ. of Aguascalientes
Osorio-Cordero, Antonio — Cinvestav

Lozano, Rogelio — Univ. of Tech. of Compiègne

11:50-12:10, Paper FrA1.3

Minimal Factorization of Transfer Matrices for Generalized Systems

Flutur, Cristian — Pol. Univ. of Bucharest

Oara, Cristian — Pol. Univ. of Bucharest

12:10-12:30, Paper FrA1.4

Sufficient Conditions for Stabilisability of Decentralised LTI Systems: Weighted Directed Graph Approach

Abdolmaleki, Mohammad — Univ. of Melbourne

Aldeen, Mohammad — Univ. of Melbourne

12:30-12:50, Paper FrA1.5

Outer Bound Estimations for the Spectral Radii of Interval Matrices

Matcovschi, Mihaela-Hanako — Gheorghe Asachi Tech. Univ. of Iasi

Pastravanu, Octavian-Cezar — Gheorghe Asachi Tech. Univ. of Iasi

Voicu, Mihail — Gheorghe Asachi Tech. Univ. of Iasi

FrA2 Regular Session, Ara

Hardware Design

Chair: Ungureanu, Florina — Gheorghe Asachi Tech. Univ. of Iasi

Co-Chair: Florea, Adrian — Lucian Blaga Univ. of Sibiu

11:10-11:30, Paper FrA2.1

Enhancing the Sniper Simulator with Thermal Measurement

Florea, Adrian — Lucian Blaga Univ. of Sibiu

Buduleci, Claudiu-Raul — Lucian Blaga Univ. of Sibiu

Chiş, Radu — Tehnical Univ. of Cluj-Napoca

Gellert, Arpad — Lucian Blaga Univ. of Sibiu

Vintan, Lucian — Lucian Blaga Univ. of Sibiu

11:30-11:50, Paper FrA2.2

Offline Error-Detection Strategies for the IDEA NXT Crypto-Algorithm

Opritoiu, Flavius — Pol. Univ. of Timisoara

Bozesan, Andreea — Pol. Univ. of Timisoara

Vladutiu, Mircea — Pol. Univ. of Timisoara

11:50-12:10, Paper FrA2.3

Dual Priority Scheduling Algorithm Used in the Nmpra Microcontrollers

Andries, Lucian — Stefan Cel Mare Univ. of Suceava

Gaitan, Vasile Gheorghita — Stefan Cel Mare Univ. of Suceava

12:10-12:30, Paper FrA2.4

Sensorial System for HYPER-REDUNDANT ARM

Vladu, Ionel Cristian — Univ. of Craiova

Vladu, Ileana — Univ. of Craiova

Ivanescu, Mircea — Univ. of Craiova
Strîmbeanu, Daniel — Univ. of Craiova

12:30-12:50, Paper FrA2.5

Hardware Event Handling in the Hardware Real-Time Operating Systems

Moisuc (Ciobanu), Elena-Eugenia — Stefan Cel Mare Univ. of Suceava
Larionescu, Alexandru-Bogdan — Stefan Cel Mare Univ. of Suceava
Ungurean, Ioan — Stefan Cel Mare Univ. of Suceava

FrA3 Invited Session, Carpati

Fractional Order Modeling and Control

Chair: Copot, Cosmin — Ghent Univ.
Co-Chair: Muresan, Cristina Ioana — Tech. Univ. of Cluj Napoca
Organizer: Copot, Cosmin — Ghent Univ.
Organizer: Muresan, Cristina Ioana — Tech. Univ. of Cluj-Napoca

11:10-11:30, Paper FrA3.1

Stabilizing Control Strategies: A Comparison between the Fractional Order Controller and the IMC (I)

Folea, Silviu — Tech. Univ. of Cluj-Napoca
Marton, Botond — Tech. Univ. of Cluj-Napoca
Muresan, Cristina Ioana — Tech. Univ. of Cluj-Napoca

11:30-11:50, Paper FrA3.2

Optimization of Fractional PID Controller by Maximization of the Criterion That Combines the Integral Gain and Closed-Loop System Bandwidth (I)

Jakovljevic, Boris — Univ. of Novi Sad
Rapaić, Milan — Univ. of Novi Sad
Šekara, Tomislav — Univ. of Belgrade
Jelicic, Zoran — Univ. of Novi Sad

11:50-12:10, Paper FrA3.3

Visual Servo Control of a Steward Platform Using Fractional-Order PID Controller (I)

Copot, Cosmin — Ghent Univ.
Ionescu, Clara — Ghent Univ.
De Keyser, Robin M.C. — Ghent Univ.

12:10-12:30, Paper FrA3.4

Fractional Order Control on a Wind Turbine Benchmark (I)

Viveiros, Carla — Inst. Superior De Engenharia De Lisboa
Melicio, Rui — Univ. De Evora
Igreja, José Manuel Cardoso — Inst. Superior De Engenharia De Lisboa
Mendes, Victor — Inst. Superior De Engenharia De Lisboa

12:30-12:50, Paper FrA3.5

Benign and Malignant Breast Tumors: Diagnosis Using Fractal Measures (I)

Dobrescu, Radu — Pol. Univ. of Bucharest

Ichim, Loretta — Pol. Univ. of Bucharest
Mocanu, Stefan — Pol. Univ. of Bucharest
Popescu, Dan — Pol. Univ. of Bucharest

FrA4 Regular Session, Laca

Optimisation

Chair: Shcherbakov, Pavel — Moscow Inst. for Control Sciences, RAS
Co-Chair: Caruntu, Constantin - Florin — Gheorghe Asachi Tech. Univ. of Iasi

11:10-11:30, Paper FrA4.1

Precedence Constraints Treatment in Ant Colony Optimization

Serbencu, Adrian Emanoil — Dunarea De Jos Univ. of Galati
Minzu, Viorel — Dunarea De Jos Univ. of Galati
Serbencu, Adriana — Dunarea De Jos Univ. of Galati

11:30-11:50, Paper FrA4.2

On the Computation of Lyapunov Functions for Discrete-Time Nonlinear Systems

Bobiti, Ruxandra Valentina — Eindhoven Univ. of Tech
Lazar, Mircea — Eindhoven Univ. of Tech

11:50-12:10, Paper FrA4.3

Optimal Control with Fixed-End Point for Linear Perturbed Systems

Ostafi, Florin — Gheorghe Asachi Tech. Univ. of Iasi
Botan, Corneliu — Gheorghe Asachi Tech. Univ. of Iasi

12:10-12:30, Paper FrA4.4

Quadratic Image of a Ball: Towards Efficient Description of the Boundary

Polyak, Boris T. — Moscow Inst. for Control Sciences
Shcherbakov, Pavel — Moscow Inst. for Control Sciences
Khlebnikov, Mikhail — Moscow Inst. for Control Sciences

12:30-12:50, Paper FrA4.5

Trajectory Planner for Mobile Robots Using Particle Swarm Optimization

Solea, Razvan — Dunarea De Jos Univ. of Galati
Cernega, Daniela Cristina — Dunarea De Jos Univ. of Galati

FrA5 Regular Session, Bucegi 1

Software Engineering

Chair: Iliescu, Dragos — Univ. Pol. of Bucharest
Co-Chair: Costeniuc, George — Continental Automotive Romania SRL Iasi

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Is FBDK Suitable for Developing and Implementing Process Control Optimization Problems?

Rohat, Oana — Pol. Univ. of Bucharest
Popescu, Dan — Pol. Univ. of Bucharest

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Double Precision Stencil Computations on Kepler GPUs

Vizitiu, Anamaria	Transilvania Univ. of Brasov
Itu, Lucian	Lucian Blaga Univ. of Sibiu
Lazar, Laszlo	SC Siemens SRL
Suciu, Constantin	SC Siemens SRL

11:50-12:10, Paper FrA5.3

Assisted Management of Product Data - a PDM Application Proposal

Iliescu, Dragos	Pol. Univ. of Bucharest
Ciocan, Ion	Pol. Univ. of Bucharest
Mateias, Ion	Doosan IMGB Bucharest

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Semantic Report Search Engine - Questor

Vasilateanu, Andrei	Pol. Univ. of Bucharest
Goga, Nicolae	Pol. Univ. of Bucharest
Moldoveanu, Alin	Pol. Univ. of Bucharest

12:30-12:50, Paper FrA5.5

SaaS Solutions for Small-Medium Businesses Developer's Perspective on Creating New SaaS Products

Resceanu, Ionut Cristian	Univ. of Craiova
Resceanu, Cristina Floriana	Univ. of Craiova
Simionescu, Sabin Mihai	SC White Pyramid SRL

FrB1 Invited Session, Miorita

New Trends in Robotic Systems

Chair: Cervera, Enric	Jaume-I Univ. of Castello de la Plana
Co-Chair: Panescu, Doru-Adrian	Gheorghe Asachi Tech. Univ. of Iasi
Organizer: Cervera, Enric	Jaume-I Univ. of Castello de la Plana
Organizer: Borangiu, Theodor	Pol. Univ. of Bucharest
Organizer: Panescu, Doru-Adrian	Gheorghe Asachi Tech. Univ. of Iasi
Organizer: Burlacu, Adrian	Gheorghe Asachi Tech. Univ. of Iasi

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Integration of Mobile Agents in Distributed Manufacturing Control (I)

Raileanu, Silviu	Pol. Univ. of Bucharest
Borangiu, Theodor	Pol. Univ. of Bucharest
Ivanescu, Nick Andrei	Pol. Univ. of Bucharest
Morariu, Octavian	Pol. Univ. of Bucharest

16:30-16:50, Paper FrB1.2

Trading Optimality for Computational Feasibility in a Sample Gathering Problem (I)

Kloetzer, Marius	Gheorghe Asachi Tech. Univ. of Iasi
Ostafi, Florin	Gheorghe Asachi Tech. Univ. of Iasi
Burlacu, Adrian	Gheorghe Asachi Tech. Univ. of Iasi

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A Constraint Satisfaction Approach for Planning of Multi-Robot Systems (I)

Panescu, Doru-Adrian	Gheorghe Asachi Tech. Univ. of Iasi
Pascal, Carlos	Gheorghe Asachi Tech. Univ. of Iasi

17:10-17:30, Paper FrB1.4

Spiking Neural Network for Controlling the Artificial Muscles of a Humanoid Robotic Arm (I)

Hulea, Mircea	Gheorghe Asachi Tech. Univ. of Iasi
Caruntu, Constantin - Florin	Gheorghe Asachi Tech. Univ. of Iasi

17:30-17:50, Paper FrB1.5

3D Complex Surface Generation through Procedural Robot Motion (I)

Borangiu, Theodor	Pol. Univ. of Bucharest
Ciocan, Mihai	Pol. Univ. of Bucharest
Raileanu, Silviu	Pol. Univ. of Bucharest
Morariu, Octavian	Pol. Univ. of Bucharest
Stocklosa , Octavian	Pol. Univ. of Bucharest

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Kinematic Evaluation of Articulated Rigid Objects (I)

Burlacu, Adrian	Gheorghe Asachi Tech. Univ. of Iasi
Condurache, Daniel	Gheorghe Asachi Tech. Univ. of Iasi
Clim, Eduard	Gheorghe Asachi Tech. Univ. of Iasi

FrB2 Invited Session, Ara

Real Time Systems Applications

Chair: Popescu, Dumitru	Pol. Univ. of Bucharest
Co-Chair: Lupu, Ciprian	Pol. Univ. of Bucharest
Organizer: Popescu, Dumitru	Pol. Univ. of Bucharest
Organizer: Lupu, Ciprian	Pol. Univ. of Bucharest

16:10-16:30, Paper FrB2.1

Emergent Intelligence in Agents: A Scalable Architecture for Smart Cities (I)

Patrascu, Monica	Pol. Univ. of Bucharest
Dragoicea, Monica	Pol. Univ. of Bucharest
Ion, Andreea	Pol. Univ. of Bucharest

16:30-16:50, Paper FrB2.2

Real Time Agent Based Simulation for Smart City Emergency Protocols (I)

Dragoicea, Monica	Pol. Univ. of Bucharest
Patrascu, Monica	Pol. Univ. of Bucharest
Serea, George Alexandru	Pol. Univ. of Bucharest

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An Approach for Load Balancing in Virtual Power Plant Structures (I)

Lupu, Ciprian	Pol. Univ. of Bucharest
Oancea, Dumitru	Pol. Univ. of Bucharest

Oara, Cristian	Pol. Univ. of Bucharest
Lupu, Mircea	Transilvania Univ. of Brasov
Apetrei, Dan	ELSACO Energy

17:10-17:30, Paper FrB2.4

Real-Time Acquisition of Quality Verified Nonstandardized Color Images for Skin Lesions Risk Assessment – a Preliminary Study (I)

Udrea, Andreea	Pol. Univ. of Bucharest
Lupu, Ciprian	Pol. Univ. of Bucharest

17:30-17:50, Paper FrB2.5

Designing Control Systems with Distributed Parameters (I)

Miron, Cristian	Pol. Univ. of Bucharest
Popescu, Dumitru	Pol. Univ. of Bucharest
Petrescu, Catalin	Pol. Univ. of Bucharest

17:50-18:10, Paper FrB2.6

Fuzzy Modeling and Control for a Road Section (I)

Dimon, Catalin	Pol. Univ. of Bucharest
Popescu, Dumitru	Pol. Univ. of Bucharest
Stefanoiu, Dan	Pol. Univ. of Bucharest

FrB3 Regular Session, Carpati

Applied Informatics

Chair: Postolache, Mihai	Gheorghe Asachi Tech. Univ. of Iasi
Co-Chair: Ciobanu, Adrian	Inst. of Computer Science, Romanian Acad. Iasi Branch

16:10-16:30, Paper FrB3.1

A Review of HDL-Based System for Real-Time Image Processing Used in Tumors Screening

Chiuchisan, Iuliana	Stefan Cel Mare Univ. of Suceava
Geman, Oana	Stefan Cel Mare Univ. of Suceava

16:30-16:50, Paper FrB3.2

A Study on Automatic Recognition of Positive and Negative Emotions in Speech

Pavaloi, Ioan	Inst. of Computer Science, Romanian Acad. Iasi Branch
Ciobanu, Adrian	Inst. of Computer Science, Romanian Acad. Iasi Branch
Luca, Mihaela	Inst. of Computer Science, Romanian Acad. Iasi Branch
Musca, Elena	Inst. of Computer Science, Romanian Acad. Iasi Branch
Barbu, Tudor	Inst. of Computer Science, Romanian Acad. Iasi Branch
Ignat, Anca	Alexandru Ioan Cuza Univ. of Iasi

16:50-17:10, Paper FrB3.3

Security Solution for Healthcare Hybrid Cloud Platform

Marcu, Roxana Elena	Pol. Univ. of Bucharest

17:10-17:30, Paper FrB3.4

Uniformity and Correlation Test Parameters for Random Numbers Generators

Petrila, Iulian — Gheorghe Asachi Tech. Univ. of Iasi

Manta, Vasile — Gheorghe Asachi Tech. Univ. of Iasi

Ungureanu, Florina — Gheorghe Asachi Tech. Univ. of Iasi

17:30-17:50, Paper FrB3.5

Artificial Intelligence Application Built for ATS Detection with a New Portable Hollow Fiber IRAS Spectrometer

Praisler, Mirela — Dunarea De Jos Univ. of Galati

Ciochina, Stefanut — Dunarea De Jos Univ. of Galati

Stoica, Atanasia — Dunarea De Jos Univ. of Galati

17:50-18:10, Paper FrB3.6

CFD Simulation of the Airflow Pattern within a Three-Bed Hospital Room with or without a Portable Air Conditioner in Use

Vladut, Gabriel — S.C. IPA CIFATT Craiova

Sbirna, Liana Simona — Univ. of Craiova

Sbirna, Sebastian — St. Stephen Ec. School of Craiova

Codresi, Cristian — Sodinal Romania

Martin, Liviu — Turceni City Hospital

FrB4 Regular Session, Laca

Control Applications

Chair: Valean, Honoriu — Tech. Univ. of Cluj-Napoca

Co-Chair: Nitulescu, Mircea — Univ. of Craiova

16:10-16:30, Paper FrB4.1

Dynamics Properties and Control for Oilwell Drillstrings

Bobasu, Eugen — Univ. of Craiova

Ivanov, Sergiu — Univ. of Craiova

Popescu, Dan — Univ. of Craiova

Rasvan, Vladimir — Univ. of Craiova

16:30-16:50, Paper FrB4.2

The Determination of the Maximum Energetic Zones for a Wind System, Operating at Variable Wind Speeds

Erdodi, Gheza-Mihai — Pol. Univ. of Timisoara

Petrescu, Doru-Ionut — Pol. Univ. of Timisoara

Sorandaru, Ciprian — Pol. Univ. of Timisoara

Musuroi, Sorin — Pol. Univ. of Timisoara

16:50-17:10, Paper FrB4.3

Modelling of Bio-Products Conversion Processes for Pollutant Compounds Formation Dynamics Assessment

Roman, Monica — Univ. of Craiova

Selisteanu, Dan — Univ. of Craiova

17:10-17:30, Paper FrB4.4

Parameter Estimation Techniques for a Rehabilitation Hand Exoskeleton

Ivanescu, Mircea	Univ. of Craiova
Popescu, Dorin	Univ. of Craiova
Nitulescu, Mircea	Univ. of Craiova
Popescu, Nirvana	Pol. Univ. of Bucharest

17:30-17:50, Paper FrB4.5

Temperature Control of the Asphaltic Emulsion in an Industrial Tank

Muresan, Vlad	Tech. Univ. of Cluj-Napoca
Abrudean, Mihail	Tech. Univ. of Cluj-Napoca
Valean, Honoriu	Tech. Univ. of Cluj-Napoca
Colosi, Tiberiu	Tech. Univ. of Cluj-Napoca

17:50-18:10, Paper FrB4.6

Variable DC Power Sources for 13C Isotope Separation Column Boiler Supply

Dulf, Eva Henrietta	Tech. Univ. of Cluj Napoca
Both, Roxana	Tech. Univ. of Cluj-Napoca
Munteanu, Radu A.	Tech. Univ. of Cluj-Napoca
Festila, Clement	Tech. Univ. of Cluj Napoca
Secara, Mihai	Tech. Univ. of Cluj-Napoca

FrB5 Regular Session, Bucegi 1

Nonlinear Systems

Chair: Sima, Vasile	National Inst. for Res. and Development in Informatics, Bucharest
Co-Chair: Halas, Miroslav	Slovak Univ. of Tech.

16:10-16:30, Paper FrB5.1

Modelling and Performance Analysis of an Urban Wastewater Treatment Plant

Luca, Laurentiu	Dunarea De Jos Univ. of Galati
Barbu, Marian	Dunarea De Jos Univ. of Galati
Caraman, Sergiu	Dunarea De Jos Univ. of Galati

16:30-16:50, Paper FrB5.2

Eigenvalues for a Nonlinear Time-Delay System

Halas, Miroslav	Slovak Univ. of Tech. in Bratislava

16:50-17:10, Paper FrB5.3

Control-Oriented Modeling and Flight Dynamics Analysis of a Flexible Generic Hypersonic Vehicle

Zhu, Jiao	Beihang Univ
Chen, Wanchun	Beihang Univ
Ma, Hongzhong	Beijing Electro-Mechanical Engineering Inst
Yang, Zhihong	Beijing Aerospace Tech. Inst

17:10-17:30, Paper FrB5.4

Imperialist Competitive Algorithm with Variable Parameters for the Optimization of a Fuzzy Controller

Ciurea, Stelian	Lucian Blaga Univ. of Sibiu
Trifa, Viorel	Tech. Univ. of Cluj-Napoca

17:30-17:50, Paper FrB5.5

Nonlinear Fuzzy Control of Human Heart Rate During Aerobic Endurance Training with Respect to Significant Model Variations

Patrascu, Adrian — Babes-Bolyai Univ. of Cluj-Napoca

Patrascu, Monica — Pol. Univ. of Bucharest

Hantiu, Iacob — Babes-Bolyai Univ. of Cluj-Napoca

17:50-18:10, Paper FrB5.6

Sampled-Data Robust Feedback Linearization Using Neural Network-Aided Unscented Kalman Filter

Zaheer, Asim — National Univ. of Sciences and Tech. of Islamabad

Hasan, Momena — National Univ. of Sciences and Tech. of Islamabad

Ali, Usman — National Univ. of Sciences and Tech. of Islamabad

Salman, Muhammad — National Univ. of Sciences and Tech. of Islamabad

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