

TECHNICAL PROGRAM

WEDNESDAY, AUGUST 29

Wednesday, August 29, 9:30–11:20
White Hall

Opening Ceremony, ALCOSP'07 and PSYCO'07 Joint Plenary Session I
Chair: S. Veres (UK)

9:45–10:30

Historical, Generic and Current Challenges of Adaptive Control

B. D. O. Anderson (*Australian National University; National ICT Australia*)

10:35–11:20

Optimal Periodic Motions of Two-mass Systems in Resistive Media

F. L. Chernousko (*Institute for Problems in Mechanics of RAS, Russia*)

11:20–11:45 — Coffee Break

Wednesday, August 29, 11:45–13:20
White Hall

ALCOSP'07 and PSYCO'07 Joint Plenary Session II
Chair: A. Kurzhanski (Russia)

11:45–12:30

Adaptive Control of Partial Differential Equations

M. Krstic (*University of California at San Diego, USA*)

12:35–13:20

Can We Make a Robot Ballerina Perform a Pirouette? Orbital Stabilization of Periodic Motions of Underactuated Mechanical Systems

A. Shiriaev (*Umeå University, Sweden; Norwegian University of Science and Technology, Norway*)

13:20–15:00 — Lunch

Wednesday, August 29, 15:00–17:00
Emperor's Library

Session PSYCO–WeP1. Discrete and Hybrid Control System (*invited*)

Organizers and Co-chairs: G. Leonov (*Russia*), **H. Nijmeijer** (*The Netherlands*)

15:00–15:20

Experimental Results on Output-Feedback Control of a Nonsmooth Rotor Dynamic System

J.-K. de Bruin, A. Doris, H. Nijmeijer, N. van de Wouw (*Eindhoven University of Technology, The Netherlands*)

15:20–15:40

Synchronization of Two Metronomes on Platform with Wheels

N. V. Kuznetsov, G. A. Leonov (*St. Petersburg State University, Russia*),
H. Nijmeijer, A. Pogromsky (*Eindhoven University of Technology, The Netherlands*)

15:40–16:00

Synchronization Stability in Oscillator Networks: Solution for Asymmetrical Configurations

I. Belykh (*Georgia State University, USA*),
V. Belykh (*Volga State Academy, Russia*),
M. Hasler (*Ecole Polytechnique Federale de Lausanne, Switzerland*)

16:00–16:20

Performance Analysis of Harmonically Forced Nonlinear Systems

A. Pogromsky, R. A. van den Berg, J. E. Rooda (*Eindhoven University of Technology, The Netherlands*)

16:20–16:40

A Criterion for Nonexistence of Limit Cycles for Differential Inclusions

A. Pogromsky, J. E. Rooda, H. Nijmeijer (*Eindhoven University of Technology, The Netherlands*)

16:40–17:00

Hybrid Adaptive Resonance Control of Vibration Machines: The Double Mass Case

D. Efimov, A. Fradkov (*Institute for Problems of Mechanical Engineering of RAS, Russia*)

17:00–17:20 — Coffee

Wednesday, August 29, 17:00–18:00
Dancing Hall

Poster Session

Moderator: M. Ananyevskiy

Asymptotic Stabilization of the Desired Uniform Motion in Underactuated Hamiltonian Systems by Linear Feedback

I. V. Burkov (*St. Petersburg State Polytechnical University, Russia*)

Self-excited Oscillations Systems with Switchings: Theory, Calculations and Investigations

Yu. Dusavitskii (*Russia*)

Computation of the First Lyapunov Quantity for Second-order Dynamical System

N. V. Kuznetsov, G. A. Leonov (*St. Petersburg State University, Russia*)

Asymptotic Harmonic Generator Design via Modification of Van Der Pol Oscillator

Y. Orlov (*CICESE Research Center, USA*),

L. T. Aguilar, L. Acho (*Centro de Investigación y Desarrollo de Tecnología Digital, Mexico*),

A. Ortiz (*CICESE Research Center, USA*)

Information-efficient Periodic Observation of the Earth Region via Geo-satellite Radar

S. N. Sharov (*CRI “Granit”, Russia*)

Algorithm of Multiple Observer-Based Synchronization for Time-varying Two-rotor Vibration System

O. Tomchina, I. Kudryavtseva (*St. Petersburg Institute of Machine Building, Russia*)

Switching Speed-Gradient Control of Passage Through Resonance for the Two-Rotor Vibration Unit

D. Tomchin (*Institute for Problems of Mechanical Engineering of RAS, Russia*)

THURSDAY, AUGUST 30

Thursday, August 30, 9:00–11:00
Emperor's Library

Session PSYCO–ThA1. Oscillations in Mechanical Systems I

Co-chairs: N. Bolotnik (*Russia*)

9:00–9:20

Dynamics and Control of a Two-degree-of-freedom Vibration-driven System

N. N. Bolotnik (*Institute for Problems in Mechanics RAS, Russia*),

M. Pivovarov, I. Zeidis, K. Zimmermann (*Technische Universitaet Ilmenau, Germany*)

9:20–9:40

Free Beam Vibration Analysis Based on the Method of Integrodifferential Relations

V. Saurin, G. Kostin (*Institute for Problems in Mechanics RAS, Russia*)

9:40–10:00

Instabilities of Spiking in Class B Laser with Vibrating External Mirror

E. V. Grigorieva, S. A. Kaschenko (*Belarus State Economic University, Belarus*)

10:00–10:20

Synchronization and Control in Ensembles of Periodic and Chaotic Neuronal Elements with Time Dependent Coupling

V. N. Belykh, E. V. Pankratova (*Volga State Academy, Russia*)

10:20–10:40

Slow Motions in Systems with Inertially Excited Vibrations

I. I. Blekhman, D. A. Indeitsev, A. L. Fradkov (*Institute for Problems of Mechanical Engineering of RAS, Russia*)

11:00–11:20 — Coffee Break

Thursday, August 30, 11:20–13:20
Emperor's Library

Session PSYCO–ThM1. Optimal Control and Stabilization

Co-chairs: L. Ryashko (*Russia*), Th. M. Guerra (*France*)

11:20–11:40

Stabilization of a Class of Nonlinear Model with Periodic Parameters in the Takagi-Sugeno Form

Th. M. Guerra, A. Kruszewski (*Université de Valenciennes et du Hainaut-Cambrésis, France*)

11:40–12:00

Optimal control of a linear system subjected to external sinusoidal and white noise excitation

D. Iourtchenko (*St. Petersburg State Polytechnical University, Russia*)

12:00–12:20

Optimal Control of Periodic Motions of Vibration-driven Systems

N. N. Bolotnik, T. Yu. Figurina (*Institute for Problems in Mechanics RAS, Russia*)

12:20–12:40

Mean Square Stability and Stabilization for Stochastic Nonlinear Oscillations

L. Ryashko (*Ural State University, Russia*)

12:40–13:00

Integrodifferential Approach to Optimal Control Problems of Elastic Beam Motions

G. Kostin, V. Saurin (*Institute for Problems in Mechanics RAS, Russia*)

13:20–15:00 — Lunch

Thursday, August 30, 11:20–13:20

Golden Hall

Session PSYCO–ThM2. Computational Methods and Software Tools for Periodic Systems (*invited*)

Organizer and Chair: A. Varga (*Germany*)

11:20–11:40

An Overview of Recent Developments in Computational Methods for Periodic System

A. Varga (*Aerospace Center, Germany*)

11:40–12:00

Comparing One-Shot and Multi-shot Methods for Solving Periodic Riccati Differential Equations

S. Johansson, A. Shiriaev, Bo Kågström (*Umea University, Sweden*),

A. Varga (*Aerospace Center, Germany*)

12:00–12:20

Matlab Tools for Solving Periodic Eigenvalue Problems

R. Granat, Bo Kågström, D. Kresser (*Umea University, Sweden*)

12:20–12:40

On Computing Minimal Realizations of Periodic Descriptor Systems

A. Varga (*Aerospace Center, Germany*)

12:40–13:00

Optimal Periodic Output Feedback Control: A Continuous Time Approach

L. Vigano, M. Lovera (*Politecnico di Milano, Italy*),

A. Varga (*Aerospace Center, Germany*)

13:20–15:00 — Lunch

Thursday, August 30, 15:00-16:35

Golden Hall

Plenary Session

Chair: G. Leonov (*Russia*)

15:00–15:45

Dealing with Periodic Disturbances in Controls of Mechanical Systems

M. Tomizuka (*University of California, USA*)

15:50–16:35

Vibrational Control of the Properties of Nonlinear Media and Design of Vibrational Dynamic Materials

I. I. Blekhman (*Institute for Problems of Mechanical Engineering of RAS; “Mekhanobr-Tekhnika” Corp., Russia*)

16:35–16:50 — Coffee Break

Thursday, August 30, 16:50–18:50

Emperor’s Library

Session PSYCO–ThP1. Nonsmooth Systems

Co-chairs: D. Peaucelle (*France*), **E. Verriest** (*USA*)

16:50–17:10

Closed-Loop Impulse Control of Oscillating Systems

A. Daryin, A. Kurzhanski (*Moscow State University, Russia*)

17:10–17:30

Locomotion of Friction Coupled Systems

E. Verriest (*Georgia Institute of Technology, USA*)

17:30–17:50

Robust Model Predictive Control of Discrete-time Switched Systems

P. Colaneri, R. Scattolini (*Politecnico di Milano, Italy*)

17:50–18:10

Stochastic Bifurcations for Random Forced Oscillations

I. Bashkirtseva, L. Ryashko (*Ural State University, Russia*),

H. Schurz (*Southern Illinois University, USA*)

18:10–18:30

Synchronized Hysteresis Regulator with Reference Adaptation and Hysteresis Correction

Yu. V. Kolokolov, S. L. Koschinsky, D. O. Tey (*State Technical University of Orel, Russia*)

A. Hamzaoui, N. Essounbouli (*Reims University, France*)

18:30–18:50

Transition from a Stable Node Equilibrium to Quasiperiodicity in Piecewise-smooth Systems

Z. Zhusubaliyev, S. Chevychelov (*Kursk State Technical University, Russia*)

E. Mosekilde (*Technical University of Denmark, Denmark*)

Thursday, August 30, 16:50–18:50

Golden Hall

Session PSYCO–ThP2. Oscillations in Mechanical Systems II

Co-chairs: A. Churilov (*Russia*), **Yu. Kolokolov** (*Russia*)

16:50–17:10

Parametric Stability of Two Induction Motor Models with Unsymmetrical Connection to the Supply-line

Yu. Kolokolov, A. Melikhov, V. Tsukanov (*State Technical University of Orel, Russia*),

A. Hamzaoui (*Centre de Recherche en STIC UFR Sciences Exactes et Naturelles, France*)

17:10–17:30

Adjoint Multivariable Repetitive Control Algorithm for Active Control of Vibration

J. Hatonen (*Borealis Polymers R&D, Finland*),

F. Zhang, S. Daley, D. Owens (*University of Sheffield, United Kingdom*)

17:30–17:50

Periodic Modes in a Mathematical Model of Testosterone Regulation

A. Churilov (*St. Petersburg State University, Russia*)

A. Medvedev (*Uppsala University, Sweden*)

A. Shepeljavyi (*St. Petersburg State University, Russia*)

FRIDAY, AUGUST 31

Friday, August 31, 9:00–11:00
Emperor's Library

Session PSYCO–FrA1. Frequency-domain Conditions and LMI

Co-chairs: **V. Reitmann** (*Russia*), **A. Shiriaev** (*Sweden*)

9:00–9:20

Frequency Domain Conditions for the Existence of Bohr Almost Periodic Solutions in Evolution Equations

V. Reitmann (*St. Petersburg State University, Russia*)

9:20–9:40

A Modified Frequency-Domain Criterion for Gradient-like Behavior of Discrete Phase Systems

A. I. Shepeljavyi, V. B. Smirnova (*St. Petersburg State University, Russia*)

9:40–10:00

Frequency-Domain Criterion for Stability of Oscillations in a Class of Nonlinear Feedback Systems

D. Altshuller (*Crane Aerospace and Electronics, USA*)

10:00–10:20

LMI Approach for Solving Periodic Matrix Riccati Equation

S. Gusev (*St. Petersburg State University, Russia*),

A. Shiriaev, L. Freidovich (*Umea University, Sweden; NTNU, Norway*)

10:20–10:40

On Kalman Canonical Decomposition of Linear Periodic Continuous-time Systems with Real Coefficients

I. Jikuya, I. Hodaka (*Nagoya University, Japan*)

10:40–11:00

Robust LFR-based Technique for Stability Analysis of Periodic Solutions

D. Peaucelle, C. Farges, D. Arzelier (*LAAS-CNRS, France*)

11:00–11:20 — Coffee Break

Friday, August 31, 11:20–13:20
Emperor's Library

Session PSYCO–FrM1. Discrete Systems

Co-chairs: B. Lampe (*Germany*) **E. Rosenwasser** (*Russia*)

11:20–11:40

Noncausal Linear Periodically Time-varying Scaling for Discrete-time Systems

T. Hagiwara, Y. Ohara (*Kyoto University, Japan*)

11:40–12:00

Digital Stabilization of Linear Continuous-time Periodic Processes with Pure Delay

B. Lampe (*University of Rostock, Germany*)

E. Rosenwasser (*State Marine Technological University, Russia*)

12:00–12:20

Empirical Determination of the Frequencies of an Almost Periodic Time Series

D. Dehay (*Université de Haute Bretagne, France*),

H. Hurd (*University of North Carolina, USA*)

12:20–12:40

A New Iterative Learning Control Scheme for Linear Time-varying Discrete Systems

L. Hladowski, K. Galkowski (*University of Zielona Gora, Poland*),

P. Lewin, E. Rogers, C. Freeman (*University of Southampton, United Kingdom*)

13:20–15:00 — Lunch

Friday, August 31, 15:00–16:35
White Hall

ALCOSP'07 and PSYCO'07 Joint Plenary Session III

Chair: M. Gitsels (*Germany*)

15:00–15:45

Impulse Control Synthesis, Fast Controls and Hybrid System Modeling

A. B. Kurzhanski (*Moscow State University, Russia; University of California at Berkeley, USA*)

15:50–16:35

From Wireless Networks to Sensor Networks and Onward to Networked Embedded Control

P. Kumar (*University of Illinois at Urbana-Champaign, USA*)

Friday, August 31, 16:40–17:50
White Hall

Panel Discussion: “Control and Signal Processing: What are Industry Needs?”

Moderator: Martin Gitsels (*Siemens Company, Germany*)

Panelists:

Itzhak Barkana (*Kulicke & Soffa Industries, Inc.*)

Yevgeny Somov (*State Research & Production Rocket-Space Center TsSKB-Progress, FKA, Russia*)

Oleg Stepanov (*CS&RI Elektropribor, Russia*)

17:50–18:10 — Closing Ceremony