

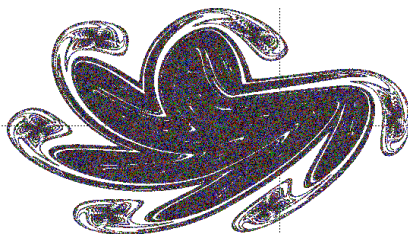
Riga Technical University, Institute of Mechanics RTU
Latvian Academy of Science, Latvian Council of Science
Latvian National Committee for Mechanics

2nd International Symposium RA'11 on

RARE ATTRACTORS AND RARE PHENOMENA IN NONLINEAR DYNAMICS

Rīga-Jūrmala, Latvia, 17-20 May, 2011

RA'11 Symposium Program



IEGULDĪJUMS TAVĀ NĀKOTNĒ



Nr. 2DP/2.1.1.2.0/10/APIA/VIAA/003

Symposium Welcome

Rare phenomena in Nonlinear Dynamics are very important and fascinating field of Nonlinear Dynamics and Chaos. How to predict in time dangerous rare attractors or to find new fruitful applications for rare dynamical phenomena is one of the important tasks of modern interdisciplinary science and engineering. 2nd Symposium on Rare Attractors and Rare Phenomena held in Rīga – Jūrmala, Latvia, May 17–20, 2011 has it aim to discuss such problem.

It is my pleasure to acknowledge all Participants and Co-chairs of the Symposium Prof. Iliya I. Blekhman (Saint Petersburg, Russia) and Albert C.J. Luo (Edwardsville, USA) for their support of the Symposium RA'11.

On behalf of Institute of Mechanics, Riga Technical University and Organizing Committee of the Symposium RA'11 I wish to all participants and guests of the Symposium to find new ideas and experience in Nonlinear Dynamics and Chaos. Enjoy making new friends and visiting Rīga-Jūrmala, Latvia.

Chair of the Symposium RA'11
Prof. Mikhail Zakrzhevsky

Location and Transport

The venue of the Symposium is the Hotel “Lielupe”- Bulduru Avenue 64/68, Jurmala, Latvia.

The Symposium will take place in 15 km from Riga – in Jurmala, the largest resort city in the Baltic States which is well-known for its natural treasures: the mild climate, sea, healthy air, curative mud and mineral water.

You can get to the Hotel “Lielupe” by train, by minibus, by taxi or by private transport.

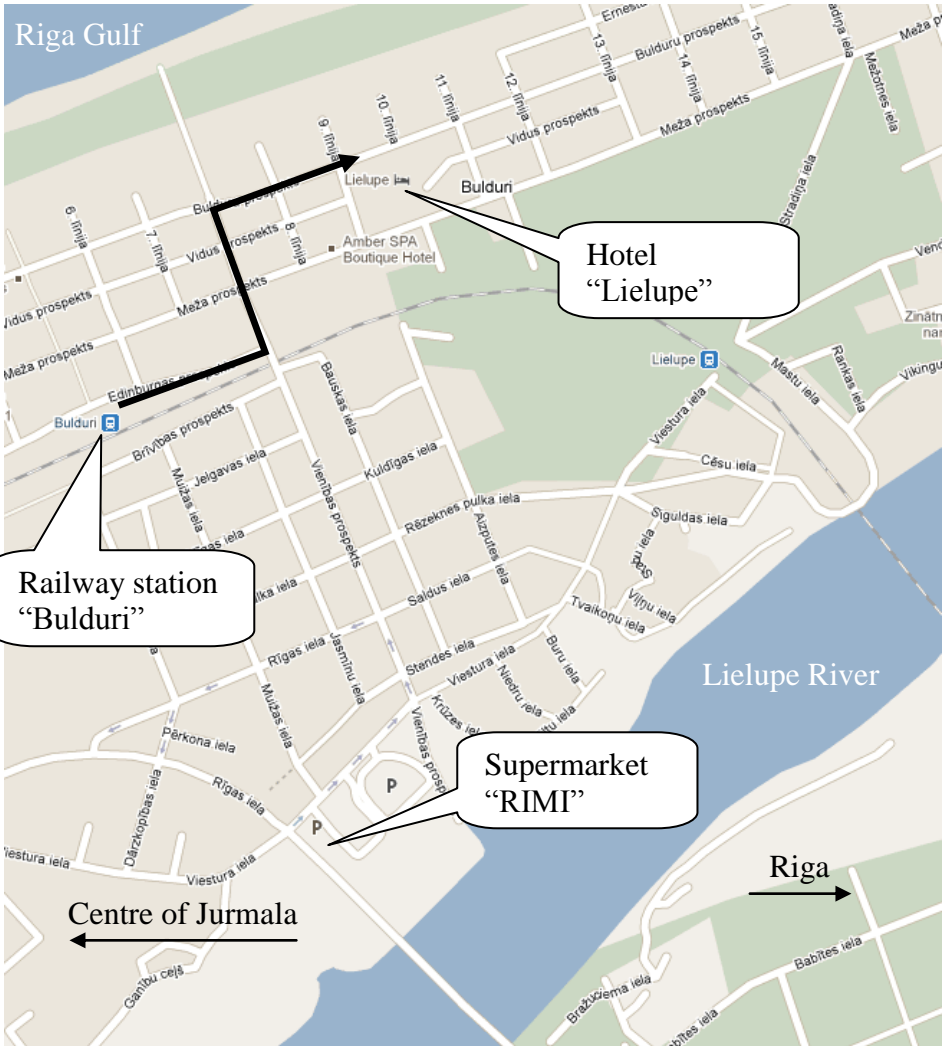
The **suburban trains** depart from Riga Central train station almost every 20 minutes and have such routes as "Riga - Dubulti", "Riga - Sloka", "Riga - Ķemeri" and "Riga - Tukums". Your destination is “Bulduri”. Distance from the railway station to the hotel is about 1 km. The tickets cost approximately 0.60-0.80 LVL.

The **minibuses** depart from Riga from the Central minibus station opposite Riga Central train station. They travel to Jūrmala every 5 minutes to destinations - Jaunķemeri, Sloka and Dubulti. The tickets cost 1.10 - 1.50 LVL and can be obtained from the driver. It is better to ask the driver to stop well in advance, near Hotel “Lielupe”.

The best way to get to the Hotel “Lielupe” from Riga International Airport is the “Baltic **Taxi**”: boarding a taxi/ hiring a taxi – 1.00 LVL; mileage rate per km - 0.50 LVL/km (from Airport to Lielupe Hotel about 20 km); customer waiting - 6.00 LVL/per hour.

When entering Jurmala by **private transport** you have to pay 1.00 LVL.

1 EUR = 0.7 LVL



Contact Number – Enquiries and Emergencies

Please contact the Symposium RA'11 organizers on
+371 26042097 (Vladislav Yevstignejev) or
+371 29346073 (Olga Kononova).

Local Organizing Committee

Prof. Mikhail V. Zakrzhevsky

Prof. Janis Viba

Dr. Vladislav Yevstignejev

Assoc. Prof. Olga Kononova

Prof. Bruno Grasmanis

Session information

Oral Presentations

- It's planned that plenary presentations are about 40 minutes and presentations are about 20 minutes in length
- Symposium room contains a Windows PC that projects onto a large screen. The PC is configured with Windows XP/Vista and Microsoft Office 2007
- Presenters must bring any digital presentation materials on a USB flash drive and/or CD/DVD prior to the start of their session to transfer their presentation to the desktop of the PC and to ensure that it opens properly.

RA'11 Symposium Program

Tuesday, May 17, 2011

8.00 – 9.00 Registration

9.00 – 10.30 Session 1 (Chair Prof. M. Sanjuan)

- **I. Blekman, K. Ivanov** (St. Petersburg, Russia)

On a Vibroimpact System in Which Chaos is Caused by the Rare Attractor Packing

- **Albert C.J. Luo** (Edwardsville, USA)

Dynamical System Interactions and Synchronization

10.30 – 11.00 Coffee break

11.00 – 13.00 Session 2 (Chairs Prof. A. Bubulis, Prof.

I. Blekman)

- **M. Zakrzhevsky** (Riga, Latvia)

Rare Attractors and Bifurcation Theory of Nonlinear Dynamics and Chaos

- **A. Bolsinov** (Loughborough, UK), **I. Basak** (Barcelona, Spain)

Bifurcation Analysis of Rubanovskii System via bi-Hamiltonian approach

- **P. Perlikowski, K. Czolczynski, A. Stefanski,**

T. Kapitaniak (Lodz, Poland)

Synchronization and Rare Attractors in Coupled Non-Identical Clocks

- **D. Verveiko, A. Verisokin, E. Postnikov** (Kursk, Russia)

Stochastic Simulation of Single-Particle Diffusion in Ultrathin Layered Liquid Film

- **Y. Aushev, A. Bogorosh, S. Voronov** (Kiev, Ukraine)

Jet Clustering Algorithms as Tools for Analyzing Data from Colliders

13.00 – 14.00 Lunch

15.00 – 21.00 Excursion to Riga and Latvian Open-Air Museum with Informal Conference Dinner

Wednesday, May 18, 2011

9.00 – 10.30 Session 3 (Chairs Prof. T. Küpper,
Prof. V. Ryabov)

- **Miguel A. F. Sanjuan** (Madrid, Spain)

Partial Control of Chaotic Systems and Escape Times

- **N. Magnitskii** (Moscow, Russia)

On Topology of Singular Attractors of Nonlinear
Differential Equations

10.30 – 11.00 Coffee break

11.00 – 13.00 Session 4

(Chair Prof. I. Ario, Prof. O. Kononova)

- **K. Lurie** (Worcester, USA)

Limit Cycles and Focusing of Disturbances in Linear
Dynamic Structures

- **T. Küpper** (Cologne, Germany)

Bifurcation of Periodic Orbits for Nonsmooth Systems

- **H. Hosham** (Cologne, Germany)

Bifurcations in Nonsmooth High-Dimensional Brake
System

- **I. Ario** (Hiroshima, Japan)

Multiple Duffing Problem for a Symmetric Folding
Structure with Hill-top Type of Symmetry-breaking

13.00 – 14.00 Lunch

14.00 – 15.30 Session 5

(Chairs Prof. K. Lurie, Prof. O. Gendelman)

- **O. Gendelman** (Haifa, Israel)

Attractors of Forced Systems with Nonlinear Energy Sinks

- **V. Serov** (Oulu, Finland)

Inverse Scattering Problems with Fixed Energy for
Nonlinear Schrödinger Equations

- **V. Ryabov** (Hokkaido, Japan), **D. Nerukh** (Birmingham, UK)

Quantifying Dynamic Traps in High-Dimensional Phase Space of Molecular Ensembles

- **T. Ventslavovich, V. Kazakevich** (Samara, Russia)
Nonlinear Riddles in Behavior of EBCD Carbon Monoxide Laser Radiation Pulses and Their Decisions

15.30 – 16.00 Coffee break

16.00 – 17.30 Session 6

(Chairs Prof. V. Serov, Prof. V. Gaiko)

- **N. Kuznetsov, O. Kuznetsova, G. Leonov** (Russia)
Lyapunov Quantities and Limit Cycles Computation in Two-Dimensional Dynamical Systems

- **V. Gaiko** (Minsk, Belarus)

Attractors of the Fitzhugh-Nagumo Neuronal Model

- **O. Ryabkov** (Moscow, Russia)

On the Gilmore-Lefranc Method Application to the Yang-Mills-Higgs System of Ordinary Differential Equations

- **A. Verisokin, D. Vervevko, E. Postnikov** (Kursk, Russia)

The Residual Method to Selkov Model in the Modified Rayleigh Form

18.00 – 21.00 Excursion to Old City Riga and Dome Cathedral (1211) with Organ Music Concert

Thursday, May 19, 2011

9.00 – 10.30 Session 7

(Chairs Prof. V. Astashev, Prof. G. Panovko)

- **J. Viba** (Riga, Latvia), **E. Kovals** (Riga, Latvia),
I. Tipans (Riga, Latvia), **G. Kulikovskis** (Riga, Latvia),
J.-G. Fontaine (Genova, Italy), **M. Kruusmaa** (Tallinn, Estonia), **W. Megill** (Bath, UK)

Nonlinear Dynamics of Robot Fish Flexible Tail Motion

- **G. Panovko, O. Volokhovskaya** (Moscow, Russia)
Transient Process Development of the Turbine Unit Rotor
after Instantaneous Imbalance

- **D. Indeitsev, D. Vavilov** (St. Petersburg, Russia)
Nonlinear Interaction of Inclusion with Elastic Medium

- **V. Astashev, E. Semenova** (Moscow, Russia)
Constrained Oblique Impact in Models of the High-
Frequency Processes and Systems

10.30 – 11.00 Coffee break

11.00 – 13.00 Session 8

(Chair Prof. O. Grigoryeva, Prof. J. Viba)

- **L. Patašiene, K. Ragulskis, A. Fedaravičius** (Kaunas,
Lithuania)

Dynamics Processes in Exciting Vibration of Piezoactuators

- **A. Bubulis** (Kaunas, Lithuania), **V. Jūrēnas** (Kaunas,
Lithuania), **D. Stepanenko** (Minsk, Belarus),

V. Minchenya (Minsk, Belarus)

Development of ultrasonic wave guide for the treatment of
intravascular occlusions

- **V. Ostasevicius** (Kaunas, Lithuania)

Vibration Peculiarity of Defected Impacting Cantilever
Structure

- **A. Bubulis, V. Jurenas, V. Maciukiene, S. Navickaite**
(Kaunas, Lithuania)

Magnetorheological Fluids for Motion Control of
Cantilever Piezoelectric Unimorph for Laser Beam Chopper

- **O. Grigoryeva, E. Ryzhov** (Volgograd, Russia)

Control Systems with Andronov-Hopp's Bifurcation on
Even Dimensional Spheres

- **V. Beresnevich, A. Klokov** (Riga, Latvia)

Some Characteristic Features of Nonlinear Parametric
Oscillations of Flexible Elements

13.00 – 14.00 Lunch

14.00 – 15.00 Poster Session

- **M.V. Zakrzhevsky, V. Frolov** (Riga, Latvia)

ABC NDC: New Software for Global Analysis of
Nonlinear Dynamics and Chaos

- **A. Klokov, M. Zakrzhevsky** (Riga, Latvia)

Nonlinear Dynamics and Rare Attractors of the Pendulum
with the Vertical Vibrating Point of Suspension

- **M. Zakrzhevsky** (Riga, Latvia), **I. Schukin** (Daugavpils,
Latvia), **V. Frolov** (Riga, Latvia),

A. Klokov (Riga, Latvia), **V. Yevstignejev** (Riga, Latvia),
R. Smirnova (Daugavpils, Latvia), **D. Pikulin** (Riga,
Latvia)

Rare Attractors in Discrete Nonlinear Dynamical Systems

- **D. Pikulin** (Riga, Latvia)

Smooth and Nonsmooth Nonlinear Phenomena in DC-DC
Converters

- **R. Smirnova** (Daugavpils, Latvia), **M. Zakrzhevsky**
(Riga, Latvia), **I. Schukin** (Daugavpils, Latvia),
V. Yevstignejev (Riga, Latvia)

The Influence of Nonlinear Dissipation on the Birth
of Rare Attractors in Dynamical Systems

- **V. Yevstignejev, M. Zakrzhevsky** (Riga, Latvia)

Clusters of Submerged Subharmonic Isles with Rare
Attractors in Two Parameters Bifurcation Diagrams

- **I. Schukin** (Daugavpils, Latvia)

Software SPRING for Nonlinear Dynamical Systems

- **C. Douskos, M. Markakis, E. Perdios** (Patras, Greece)

Exotic Equilibrium Points of Restricted Three-Body
Problem Variants and Fractal Basins of Convergence

- **K. Ivanov** (Almaty, Kazakhstan)

The Phenomenon of Force Adaptation in Nonlinear
Mechanical Systems

15.30 – 21.00 Boat Trip by Lielupe River with Informal Picnic

Friday, May 20, 2011

9.00 – 10.30 Session 9

(Chairs Prof. I. Bula, Prof. M. Zakrzhevsky)

- **A. Zlenko** (Moscow, Russia)

The Motion of Two Viscously - Elastic Balls in the Central Force Field as

a Model of Double Planet

- **V. Yevstignejev** (Riga, Latvia), **M. Zakrzhevsky** (Riga, Latvia), **A. Toporensky** (Moscow, Russia)

On the Possibility of Rare Attractors in Scalar Field Cosmology

- **I. Bula, V. Duka, I. Liepiņa** (Riga, Latvia)

Molecular Modeling of Protein as Nonlinear Dynamical System

- **E. Ryzhov** (Volgograd, Russia)

Control Systems with Orbital Stable Torus in the Problem of Amplitude Stabilization

- **A. Gorobtsov, E. Ryzhov, A. Churzina** (Volgograd, Russia)

Qualitative Researches of Processes of Lame in the Ring

10.30 – 11.00 Coffee break

11.00 – 13.00 Session 10

- **Discussion** “Open Problems of the Theory of Rare Dynamical Phenomena in Nonlinear Systems” (Chair Prof. I. Blekhman)

- **Closing ceremony and Awarding of Young Scientists**

13.00 – 14.00 Lunch