

Naučno društvo Srbije

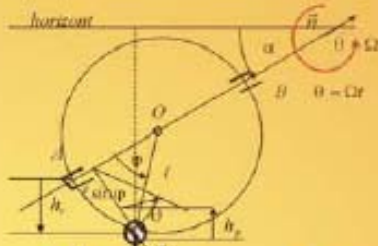


Serbian Scientific Society

<http://afrodita.rcub.bg.ac.rs/~nds/>

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Serbian Scientific Society



$$\begin{aligned} (\vec{v})_r &= \ell [\cos \alpha \sin \varphi - \sin \alpha (1 - \cos \varphi)] \\ (\vec{v})_\varphi &= \ell \sin \varphi \cos \alpha (1 - \cos \theta) \\ (\vec{v})_\theta &= \ell [\sin \alpha (1 - \cos \varphi) - \sin \varphi \cos \alpha \cos \theta] \end{aligned}$$

Symposium

Nonlinear Dynamics Milutin Milanković

Multidisciplinary and Interdisciplinary Applications

(SNDMIA 2012),

Belgrade, October 1-5, 2012.

(Eighth Serbian Symposium in area of Non-linear Sciences)

$$\ddot{\varphi} + \Omega^2 (\lambda - \cos \varphi) \sin \varphi = \Omega^2 \lambda \epsilon \eta \alpha \cos \varphi \cos \Omega t$$



Editors: **Katica R. (Stevanović) HEDRIH**
Žarko Mijajlović

Approximate equations

a* for $\varphi = 0, \lambda > 1$

$$\ddot{\varphi} + \Omega^2 (\lambda - 1) \varphi = \Omega^2 \lambda \epsilon \eta \alpha \cos \Omega t$$

b* for $\varphi_2 = \pm \arccos \lambda$

$$\ddot{\varphi} + \Omega^2 \left(\lambda - \lambda^2 \right) \left[1 + \frac{\lambda \cos \varphi}{\sqrt{1 - \lambda^2}} \cos \Omega t \right] \varphi = \Omega^2 \lambda \epsilon \eta \alpha \cos \Omega t$$

Booklet of Abstracts

Beograd, October 1-5, 2012.

Symposium Venue at Mathematical Institute SANU

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Symposium Nonlinear Dynamics – Milutin Milanković
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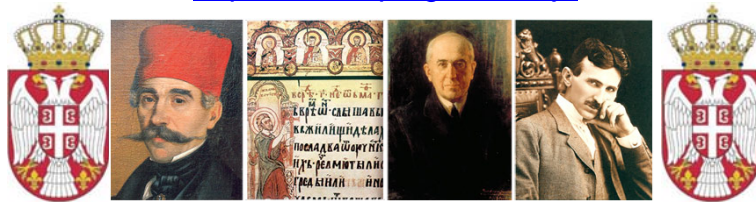
Beograd, October 1-5, 2012.
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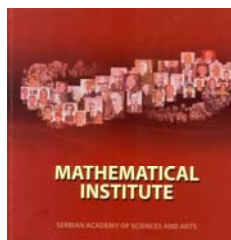
Main organizers:

Department of natural-mathematical sciences of Serbian Scientific Society
 and supported by Project ON174001 (2011-2014)
 coordinated through
 Department of Mechanics at Mathematical Institute SANU

Support by
 Ministry of Education and Science Republic of Serbia
<http://www.mpn.gov.rs/sajt/>



Supported by
Co-organizers scientists from
 Serbian Society of Mechanics,
 Institute „Mihajilo Pupin“ Belgrade,
 Institute „Vinča“,
 The Society of Physical Chemists of Serbia
 Faculty of Physical Chemistry University of Belgrade and
 Faculty of Technical Sciences Kosovska Mitrovica, University of Pristina
 with allocated place in Kosovska Mitrovica.



Venue of Symposium – Mathematical Institute SANU
Ul. Knez Mihailova 36/III, Auditoria I



October 1, 2012, Belgrade, Serbia

Dear Participant,

The **Symposium Nonlinear Dynamics - Milutin Milanković, Multidisciplinary and Interdisciplinary Applications, (SNDMIA 2012), Belgrade, October 1-5, 2012., (Eighth Serbian Symposium in area of Non-linear Sciences), (Симпозијум Нелинеарна динамика - Мулти и интердисциплинарне примене)** is held in Belgrade, Serbia, and is organized by the Serbian Scientific Society and supported by Project ON174001 (2011-2014) coordinated through Department of Mechanics at Mathematical Institute SANU, in the framework of the scientific activities of the active researchers in area of Nonlinear Dynamics in Serbia and Russia.

Scientific support to the **Symposium Nonlinear Dynamics - Milutin Milanković, Multidisciplinary and Interdisciplinary Applications, (SNDMIA 2012), Belgrade, October 1-5, 2012** is given by following scientific institution in Serbia: Serbian Society of Mechanics, Institute „Mihajilo Pupin“ Belgrade, Institute „Vinča“, The Society of Physical Chemists of Serbia, Faculty of Physical Chemistry University of Belgrade and Faculty of Technical Sciences Kosovska Mitrovica, University of Pristina with allocated place in Kosovska Mitrovica.

Financial support in part is given by Ministry of Education, Science and Technology Republic of Serbia <http://www.mpn.gov.rs/sajt/>.

The objective of the SYMPOSIUM is to bring together scientists and engineers working in different areas of science to present and discuss recent developments on different problems of nonlinear dynamics with multi and interdisciplinary applications.

Technical Program

- Plenary Lectures (13 Plenary Lectures by Leading Scientists in Nonlinear Dynamics - 40 minutes Lectures)
- Invited Lectures and Keynote Lectures (12 Invited Lectures or Keynote Lectures in sessions in different topics of natural-mathematical sciences and engineering – 30 minutes);
- Contributed Lectures and Presentations by Symposia participants (Contributed Lectures and Presentations accepted by Symposium Scientific Committee - 20 minutes;).

MAIN TOPICS OF THE SYMPOSIUM

A* Models and methods (analytical, numerical, geometrical, experimental) in nonlinear dynamics.

Qualitative and quantitative analysis of nonlinear dynamic systems.

B* Nonlinear dynamics of continuous, discontinuous and hybrid systems.

C* Bifurcations and chaos.

D* Nonlinear stochastic systems.

E* Nonlinear dynamic phenomena.

F* Control of oscillations and chaos.

G* Applications in mechanics at different scales, and real problems from any branch of engineering science including mechanical, civil, electronic, electrical, communication, medical, materials.

H* Cross-disciplinary topics from applied mathematics, physics, biophysics, genetics, nanotechnology, finance, medicine and earth sciences.

A ROUND TABLE: Research ethics and evaluation of scientific and technological research results.

Since 1992, the European Mechanics Society (EUROMECH) organizes *European Nonlinear Oscillations Conferences* (ENOCs) through its ENOC Committee. Actually, these events have a much longer tradition, since they are successors of the former ICNO (International Conference on Nonlinear Oscillations) series held from 1961 to 1990 in East-European countries. Starting with the 1st International Conference on Nonlinear Oscillations organized in Kiev, 1961, by Professor Yu. A. Mitropolsky, twelve ICNOs were held till 1990. Then, starting with the 1st European Nonlinear Oscillations Conference in Hamburg, 1992, six ENOCs were organized till 2008 (Prague, Copenhagen, Moscow, Eindhoven, St. Petersburg). Details are done in Appendix II.

Professor G. Rega was organizer last ENOC Rome 2012 and we point out his sentences: "It is a great privilege to host the 50th Anniversary Conference of the ICNO-ENOC series in Rome, for the first time in a South-European country".

First Serbian Scientific meeting in area of Nonlinear mechanics (nonlinear oscillations and nonlinear dynamics) is organized by Serbian Society of Mechanics and Yugoslav society of Mechanics in 1984 in Arandjelovac. Academician Yu. Alekseevich Mitropolsky attend this Serbian Symposium and give one Plenary invited Lectures. Starting from this period Series of the scientific Symposia or Mini-Symposia is organized by Chair of Mechanics of Mechanical Engineering Faculty University of Niš supported by Yugoslav or Serbian Society of Mechanics. Details are done in Appendix III.

We are happy to report that our **Symposium Nonlinear Dynamics - Milutin Milanković** has largely them previous with 83 accepted abstracts of the nonlinear dynamics contributions in different area of sciences from 12 countries are accepted and included in the program. A few Regular Sessions and one Special Session were organized.

We would like to thank all participants for their scientific contribution to **Symposium Nonlinear Dynamics - Milutin Milanković**, as well as colleagues and friends who meaningfully helped with the organization.

On behalf of the Serbian Scientific Society, welcome to Belgrade, the "Nice City", and enjoy a scientifically stimulating and socially pleasant **Symposium Nonlinear Dynamics - Milutin Milanković!**

We would like to wish all participants of this Symposium a warm welcome to our country and our Serbian Scientific Society and Venue Symposia place at Mathematical Institute SANU.

We would like to welcome you, hoping that creative efforts and achievements will prevail over preemption.

Katica R. (Stevanović) HEDRIH and Žarko Mijajlović
Chairs of **Symposium Nonlinear Dynamics - Milutin Milanković**
Serbian Scientific Society



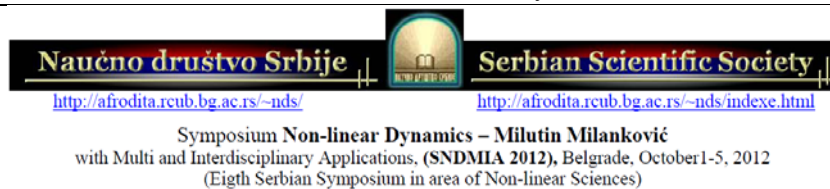
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With Multidisciplinary and Interdisciplinary Applications
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Editors: Katica R. (Stevanović) HEDRIH
Žarko Mijajlović

PROGRAM

Beograd, October 1-5, 2012.
Venue: Mathematical Institute SANU



PROGRAM

Venue of Symposium–Mathematical Institute SANU, Ul. Knez Mihailova 36/III, Auditoria I

October 1, 2012 at 09,00h-09,40 h

Opening of the Symposia Nonlinear Dynamics - Svečano otvaranje simpozijuma

Speakers

- * Members of Honorary Scientific Committee
- * President of Serbian Scientific Society
- * Invited Speakers - Scientists
- *Chairman of Symposium: **SYMPOSIUMS ON NONLINEAR MECHANICS IN SERBIA, ICNO AND ENOC**

October 1, 2012 at 9,45h-10,25 h, Plenary Lecture

Chairs: H. Yabuno, Marina V. Shitikova and Dragan Milosavljević

PL-1. ID-60. DYNAMICS OF MULTI-VALUED VECTOR FIELDS WITH BOUNCING FLOWS IN DISCONTINUOUS DYNAMICAL SYSTEMS, Albert C. J. Luo, Mechanical and Industrial Engineering, Southern Illinois University Edwardsville, U. S. A.

October 1, 2012 at 10,30h-11,10h, Plenary Lecture

Chairs: H. Yabuno, Marina V. Shitikova and Dragan Milosavljević

L-2. ID-6. SMALL NONLINEAR OSCILLATIONS OF THE SATELLITE IN AN WEAKLY ELLIPTICAL ORBIT PLANE (THE COMPARATIVE ANALYSIS OF ASYMPTOTIC METHODS OF RESEARCH)

P.S. Krasilnikov, Department of Differential Equations, Moscow State Aviation Institute, Russia.

Break 11,10h-12,00h

October 1, 2012 at 12,00h-12,40h, Plenary Lecture

Chairs: Albert C. J. Luo, Ljiljana Kolar-Anić and Yury A. Rossikhin

PL-3. ID-67. EXPERIMENTAL INVESTIGATIONS OF ANALYSIS AND CONTROL OF NONLINEAR PHENOMENA IN SOME MECHANICAL SYSTEMS, H. Yabuno, Department of Mechanical Engineering, Faculty of Science and Technology, Keio University, JAPAN

Break 12,50-13,00h

October 1, 2012 at 13,00h-14,00h, Invited Lectures

Chairs: Albert C. J. Luo, Ljiljana Kolar-Anić and Yury A. Rossikhin.

IL-1. ID-5. GENERALIZED VAN DER POL OSCILLATORS: FROM A LIMIT CYCLE TO THE ENTRAINMENT PHENOMENON, I. Kovacic, Department of Mechanics, Faculty of Technical Sciences, University of Novi Sad, 21 000 Novi Sad, Serbia.

IL-2. ID-34. WALL FUNCTION CONCEPT FOR MODELING TURBULENT CHANNEL FLOW, B. Stankovic¹, M. Sijercic¹, S. Belosevic¹, S. Cantrak², ¹Institute of Nuclear Sciences “Vinca”, Belgrade University, Laboratory for Thermal Engineering and Energy, Belgrade, ² Faculty of Mechanical Engineering, Belgrade University, Belgrade, Serbia.

October 1, 2012 at 14,00h-14,40 h, Contributed Lectures**Chairs:** Ivana Kovačić, O. Kholostova and I. Ryabichova**CL-1. ID-1. NONLINEAR DYNAMIC EFFECTS IN CYCLIC MACHINES , I. Vulfson**, St.-Petersburg State University of Technology and Design, Bolshaya Morskaya,18, 191186, St-Petersburg , Russia.**CL-2. ID-9. UNEXPECTED FEATURE OF NEW OSCILLATING HOMOGENEOUS REACTIONS: ALKYNES CARBONYLATION IN Pd COMPLEXES SOLUTIONS, Sergey N. Gorodsky**, Department of Basic Organic Synthesis, Moscow State University of Fine Chemical Technologies (MITHT), Moscow, Russia**Break 14,40-16,00h****October 1, 2012 at 16,00h-19,30h, Invited Lectures - Special Session****Chairs:** Boris A. Malomed, Milivoj Belić and A. Maluckov.**IL-3. ID-52. EXACT SOLUTIONS TO THE MULTIDIMENSIONAL GENERALIZED NONLINEAR SCHRÖDINGER EQUATION AND THEIR STABILITY, Milivoj Belić^a**, Wei-Ping Zhong^b, Nikola Petrović^c, Najdan Aleksić^c. ^aTexas A&M University at Qatar, 23974 Doha, Qatar, ^bShunde Polytechnic, Shunde 528300, China, ^cInstitute of Physics, University of Belgrade, Serbia**IL-4. ID-53. BIFURCATIONS AND SYNCHRONIZATION IN SYSTEMS OF REALISTIC NEURONAL MODELS, Nikola Buric**, Institute of Physics, University of Belgrade**IL-5. ID-51. GEOMETRIC RESONANCES IN BOSE-EINSTEIN CONDENSATES WITH TWO- AND THREE-BODY INTERACTIONS, A. Balaž¹**, H. Al Jibbouri², I. Vidanović³, Axel Pelster⁴, (¹ Scientific Computing Laboratory, Institute of Physics Belgrade, University of Belgrade, Serbia, ² Institute for Theoretical Physics, Free University of Berlin, Germany, ³ Scientific Computing Laboratory, Institute of Physics Belgrade, University of Belgrade, Serbia, ⁴ Department of Physics and Research Center OPTIMUS, Technical University of Kaiserslautern, Germany)**IL-6. ID-56. NONLINEAR IONIC PULSES ALONG MICROTUBULES, Miljko V. Satarić**, Faculty of Technical Sciences, University of Novi Sad, Novi Sad, Serbia**IL-7. ID-57. SOLITON DYNAMICS IN ONE-DIMENSIONAL WAVEGUIDE ARRAYS WITH SATURABLE, SELF-DEFOCUSING NONLINEARITY, M. Stepić¹**, P. P. Beličev¹, A. Maluckov¹, I. Ilić¹, D. Kip², A. Kanshu², C.E. Rüter², V. Shandarov³. ¹ Vinča Institute of Nuclear Sciences, Belgrade, Serbia, ² Faculty of Electrical Engineering, Helmut Schmidt University, Hamburg, Germany, ³ State University of Control Systems and Radioelectronics, Tomsk, Russia**IL-8. ID-54. ULTRAFast-LASER FABRICATION OF PHOTONIC COMPONENTS, J. Petrović¹**, V. Mezentsev², ¹ Institute of Nuclear Sciences Vinca, Beograd, Serbia**IL-9. ID-55. SELF-ORGANIZATION IN THE HIDDEN MARKOV MODEL OF WAVELET SIGNAL PROCESSING, M. Milovanović¹**, M. Rajković², ¹ Mathematical Institute of the Serbian Academy of Arts and Sciences, Belgrade, ² Vinca Institute of Nuclear Sciences, Belgrade, Serbia,

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October 2, 2012 at 8,30h-09,40 h, Contributed Lectures**Chairs:** Ilya B. Simanovskii, I. Vulfson and Ljiljana Kolar-Anić.**CL-14. ID-8. CHAOTIC OCCURRENCE OF THE RECORDED EARTHQUAKE MAGNITUDES IN SERBIA , S. Kostić¹**, N. Vasović², ¹ University of Belgrade Faculty of Mining and Geology, Djusina 7, Belgrade, Serbia,, ² University of Belgrade Faculty of Mining and Geology, Djusina 7, Belgrade, Serbia, e-mail:**CL-15 ID-7. A SIMPLE MODEL OF EARTHQUAKE NUCLEATION WITH TIME-DELAY , S. Kostić¹**, I. Franović², K. Todorović³, N. Vasović⁴, ¹ University of Belgrade Faculty of Mining and Geology, Belgrade, Serbia, ² University of Belgrade Faculty of Physics, Belgrade, Serbia, ³ University of Belgrade Faculty of Pharmacy, Belgrade, Serbia, ⁴ University of Belgrade Faculty of Mining and Geology, Belgrade, Serbia.

CL-9. ID-74. NONLINEAR OSCILLATORY FLOWS WITH DIFFERENT SYMMETRY PROPERTIES IN TWO-LAYER SYSTEMS, Ilya B. Simanovskii, Department of Mathematics, Technion, Israel Institute of Technology, Haifa, Israel

October 2, 2012 at 9,45h-10,25 h, Plenary Lecture

Chairs: A. Markeev, Žarko Mijajlović and Pavel Krasilnikov.

PL-4. ID-21. BRIGHT SOLITONS IN SELF-DEFocusing MEDIA, Olga V. Borovkova,¹ Yaroslav V. Kartashov,¹ Valery E. Lobanov,¹ **Boris A. Malomed**,^{2,1} Lluís Torner,¹ and Victor A. Vysloukh^{3,1}, ¹ICFO-Institut de Ciències Fotoniques, and Universitat Politècnica de Catalunya, 08860 Castelldefels (Barcelona), Spain, ²Department of Physical Electronics, School of Electrical Engineering, Faculty of Engineering, Tel Aviv University, Tel Aviv 69978, Israel, ³Departamento de Física y Matemáticas, Universidad de las Américas – Puebla, Mexico

October 2, 2012 at 10,30h-11,10h, Plenary Lecture

Chairs: A. Markeev, Žarko Mijajlović and Pavel Krasilnikov.

PL-5. ID-30. FURTHER RESULTS ON APPLICATIONS OF FRACTIONAL CALCULUS IN NONLINEAR DYNAMICS - STABILITY AND CONTROL ISSUES, M. Lazarević Department of Mechanics, Faculty of Mechanical Engineering, Serbia.

Break 11,10h-12,00h

October 2, 2012 at 12,00h-12,40h, Plenary Lecture

Chairs: Mihailo Lazarević, Albert Luo and Stevan Maksimović

PL-6. ID-18. CHAOS IN MULTIPLE-TIME-SCALE DYNAMICS OF THE BRAY-LIEBHAFSKY OSCILLATORY REACTION, Ž. Čupić¹ and Lj. Kolar-Anić^{2,1} Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Center of Catalysis and Chemical Engineering, Belgrade, Serbia, ² Faculty of Physical Chemistry, University of Belgrade, Serbia

Break 12,50-13,00h

October 2, 2012 at 13,00h-15,00h, Invited Lectures

Chairs: Alexander V. Rodnikov, Sergey N. Gorodsky and Stevan Maksimović

IL-10. ID-36. DIFFERENTIAL EQUATIONS OF MOTION OF MECHANICAL SYSTEMS WITH NONLINEAR NONHOLONOMIC CONSTRAINTS – VARIOUS FORMS AND THEIR EQUIVALENCE, Zekovic N. Dragomir, University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia.

IL-11. ID-3. SOME ASPECTS OF BIRD IMPACT THEORY, M. Ugrčić¹, ¹ Economics Institute, Belgrade, Serbia.

IL-12. ID-73. THE USE OF FINITE ELEMENTS METHOD IN VIBRATIONAL PROPERTIES CHARACTERIZATION OF MOUSE EMBRYO IN ICSI, A. Hedrih¹, M. Ugrčić², ¹ State University in Novi Pazar, Novi Pazar, Serbia, ² Economics Institute, Belgrade, Serbia.

IL – 13. ID-15. RAYLEIGH-BENARD CONVECTIVE INSTABILITY IN THE PRESENCE OF TEMPERATURE MODULATION, M. Jovanović¹, D. Živković², J. Nikocijević^{3, 1,2,3} University of Niš, The Faculty of Mechanical Engineering, Niš, Serbia.

Break 15,00-16,30h

October 2, 2012 at 16,30h-19,10h, Contributed Lectures

Chairs: S. Cantrak, M. Jovanović and A. Zlenko.

CL-4. ID- 27. STABILITY INVESTIGATION OF A RIGID BODY AND A SYSTEM OF RIGID BODIES UNDER RAPID VIBRATIONS, O. Kholostova, Faculty of Applied Mathematics and Physics, Moscow Aviation Institute (National Research University), Moscow, Russia.

CL-5. ID- 32. THE NEW FORM OF FORCE FUNCTION OF TWO FINITE BODIES IN TERMS OF MODIFIED DELAUNAY'S AND ANDOYER'S ANGLE VARIABLES, A. Zlenko, Department of high mathematics of Moscow automobile and road construction state technical university (MADI), Moscow, Russia.

CL-6. ID-35. SOME DYNAMICAL PROBLEMS FOR A PARTICLE TETHERED TO A RIGID BODY, Alexander V. Rodnikov¹, ¹ Bauman Moscow State Technical University, Moscow, Russia.

CL-7. ID-37. THE DEFINITION OF OPTIMAL MASS OF LOADER WITH A STOCHASTIC MODEL OF WORKING PARAMETERS, I. Ryabycova, Department of descriptive geometry of Moscow automobile and road construction state technical university (MADI), Moscow, Russia,

CL-8. ID-66. ELEMENTS OF MODIFICATIONS AND SENSITIVITY OF DYNAMIC PARAMETERS, Nataša Trišović, Faculty of Mechanical Engineering, Belgrade, Serbia.

CL-10. ID-12. ON STABILITY OF SINGULAR TIME DELAY SYSTEMS OVER THE FINITE TIME INTERVAL: CLASSICAL AND LMI APPROACH, D. Lj. Debeljkovic¹, S. B. Stojanovic², G. V. Simeunovic¹, N. J. Dimitrijevic¹, ¹ Faculty of Mechanical Engineering, University of Belgrade, Kraljice Marije 16, 11120 Belgrade, ² Faculty of Technology, University of Nis, Leskovac, Serbia.

CL-11. ID-16. MATHEMATICAL MODEL OF AERIAL ROBOTS AS THE BASIS FOR NEW RESEARCH, M. Filipovic¹, ¹ Mihajlo Pupin Institute, The University of Belgrade, Volgina 15, 11060 Belgrade, Serbia, e-mails: mirjana.filipovic@pupin.rs

CL-12. ID-11. PRECISE TRAJECTORY TRACKING OF ROBOTIC MECHANISM, Lj. Kevac¹, M. Filipovic², ¹ School of Electrical Engineering, The University of Belgrade, Belgrade, ² Mihajlo Pupin Institute, The University of Belgrade, Belgrade.

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October 3, 2012 at 8,30h-09,40 h, Contributed Lectures

Chairs: I. Ryabycova, Ljiljana Kolar-Anić and V. Dragičević.

CL-16. ID-10, REGRESION AND WEIBULL ANALYSIS OF CROPPING PRACTICES IN CHANGING CLIMATE, V. Dragičević, Ž. Videnović, B. Kresović, M. Simić, Z. Dumanović, I. Spasojević¹, Maize Research Institute “Zemun Polje”, Serbia.

CL17. ID-20. THE COMPARATIVE ANALYSIS OF NONLINEAR ALGORITHMS FOR TWO TANK SYSTEM CONTROL, A. Ćosić, M. Šušić, Mihajlo Pupin Institute, Robotics Laboratory, The University of Belgrade, Belgrade, Serbia,

CL-18. ID-23. H₂ AND H_∞ BASED OPTIMAL PLACEMENT OF ACTUATORS AND SENSORS FOR ACTIVE VIBRATION CONTROL, Tamara Nestorović, Miroslav Trajkov, Institute of Computational Engineering, Mechanics of Adaptive Systems, Ruhr-Universität Bochum, Germany

October 3, 2012 at 9,45h-10,25 h, Plenary Lecture

Chairs: A. Markeev and Dragutin Debeljković.

PL-7. ID-25. MODERN CONCEPTS OF ACTIVELY CONTROLLED SMART STRUCTURES – AN OVERALL DESIGN APPROACH, Tamara Nestorović, Institute of Computational Engineering, Mechanics of Adaptive Systems, Ruhr-Universität Bochum, Universitätsstr. 150, D-44801 Bochum, Germany

October 3, 2012 at 10,30h-11,10h, Plenary Lecture

Chairs: E. Grebenikov, Zekovic N. Dragomir and Nataša Trišović

PL-8. ID-50. WAVE PROPAGATION IN FIBRE REINFORCED COMPOSITE LAMINATES D. Milosavljević, G. Bogdanović Faculty of Engineering The University of Kragujevac, Sestre Janjić 6, 34000 Kragujevac, Serbia

Break 11,10h-11,30h

October 3, 2012 at 11,30h-12,10h, Plenary Lecture

Chairs: E. Grebenikov, Zekovic N. Dragomir and Nataša Trišović

PL-9. ID-28. SOME PROBLEMS OF DYNAMICS OF A HEAVY RIGID BODY CARRYING A MATERIAL POINT, A. Markeev, Ishlinski Institute for Problems in Mechanics of the Russian Academy of Sciences, Moscow, Russia.

Break 12,10-12,40h

October 3, 2012 at 12.40h-13.20h, Plenary Lectures**Chairs:** A. Markeev, Zekovic N. Dragomir and Ljiljana Kolar-Anić**PL-10. ID-69. ONE APPLICATION OF REGULARLY VARYING FUNCTIONS TO FRIEDMANN EQUATIONS, Žarko Mijajlović, University of Belgrade – Faculty of Mathematics, Belgrade, Serbia****October 3, 2012 at 13.20h-15.00h, Contributed Lectures****Chairs:** Tamara Nestorović, Ivana Atanasovska and Marinko Ugrčić**CL-19. ID-26. OPTIMAL PLACEMENT OF PIEZOELECTRIC ACTUATORS AND SENSORS FOR SMART STRUCTURES USING GENETIC ALGORITHM, Seyed Mehdi Garmabi¹, Miroslav Trajkov² and Tamara Nestorović^{3, 1, 2, 3} Institute of Computational Engineering, Mechanics of Adaptive Systems, Ruhr-Universität Bochum, Universitätsstr. Bochum, Germany****CL-20. ID-29. FURTHER RESULTS ON MODELING OF BIOIMPEDANCE OF THE HUMAN SKIN: CALCULUS OF NON-INTEGERS ORDER APPROACH, M. Lazarević^{1,2}, Z. Vosika, PhD², G. Lazović³, J. Simić-Krstić², Đ. Koruga²,¹ Department of Mechanics,² Module of Biomedical Engineering, Faculty of Mechanical Engineering,²The University of Belgrade,³ Department of Mathematics, Faculty of Mechanical Engineering,****CL-21. ID-2. DYNAMICS OF GEAR-PAIR SYSTEMS WITH PERIODIC VARYING MESH STIFFNESS - SPUR GEARS VS HELICAL GEARS, I. Atanasovska, M. Vukšić Popović, Institute Kirilo Savić, Belgrade, Serbia.****CL-22. ID. 4. FINITE ELEMENT MODELING OF WINDSHIELD- AND WING-BIRD STRIKES, M. Ugrčić, Economics Institute, Belgrade, Serbia.****CL-23. ID-19. THE POTENTIAL ROLE OF BULK WATER IN BRAY-LIEBHAFSKY OSCILLATORY REACTION, D. Stanisavljev, M. Milenković, Faculty of physical chemistry, The University of Belgrade, Studentski trg 12-16, 11000 Belgrade, Serbia****Break 15.00-16.30h****October 3, 2012 at 16.30h-19.10h, Contributed Lectures - Special Session****Chairs:** Ž. Čupić, Ana Ivanović-Šašić and S. Anić**CL-24. ID-31. APPLICATION OF NON-LINEAR FREQUENCY RESPONSE METHOD FOR INVESTIGATION OF PERIODICALLY OPERATED CHEMICAL REACTORS, D. Nikolic Paunic¹, M. Petkovska²,¹ Institute of Chemistry, Technology and Metallurgy, The University of Belgrade, Belgrade,² Faculty of Technology and Metallurgy, Department of Chemical Engineering, The University of Belgrade, Belgrade.****CL-25. ID-38. APPLICATION OF NONLINEAR FREQUENCY RESPONSE METHOD FOR INVESTIGATION OF GAS ADSORPTION, D. Brzić, M. Petkovska, Faculty of Technology and Metallurgy, University of Belgrade, Belgrade****CL-26. ID-40. NUMERICAL EVIDENCE OF COMPLEX NONLINEAR PHENOMENA OF THE BELOUSOV-ZHABOTINSKY OSCILLATORY REACTION UNDER BATCH CONDITIONS, S. M. Blagojević¹, S. N. Blagojević² and S. Anić³,¹ Faculty of Pharmacy, University of Belgrade, Belgrade,² Institute of General and Physical Chemistry, Belgrade,³ Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia****CL-27. ID-41. BIFURCATION ANALYSIS OF THE OSCILLATORY REGION OF A HYPOTHALAMIC-PITUITARY (HPA) AXIS MODEL, S. Maćešić¹, V. M. Marković¹, A. Ivanović-Šašić², Ž. Čupić² and Lj. Kolar-Anić¹,¹ Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia,² Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Department of Catalysis and Chemical Engineering, Belgrade, Serbia.****CL-28. ID-42. A NEW STRUCTURE OF CHAOS IN THE BRAY LIEBHAFSKY OSCILLATORY REACTION, Ana Ivanović-Šašić¹, Vladimir Marković², Željko Čupić¹, Ljiljana Kolar-Anić², Slobodan Anić¹,¹ Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Department of Catalysis and Chemical Engineering, Njegoševa 12, 11000 Belgrade, Serbia,² Faculty of Physical Chemistry, University of Belgrade, Studentski trg 12-16, 11000 Belgrade, Serbia.****CL-29. ID-43. QUALITATIVE AND QUANTITATIVE ANALYSIS OF THE CHAOTIC SEQUENCE IN THE BRAY-LIEBHAFSKY REACTION, Ana Ivanović-Šašić¹, Marija Janković², Stevan Blagojević³ and Nataša Pejić⁴,¹ Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Department of Catalysis and Chemical**

Engineering, Belgrade, Serbia, ²University of Belgrade, Institute Vinča, Radiation and Environmental Protection Department, Belgrade, Serbia, ³Department of Electrochemistry, Institute of General and Physical Chemistry, Belgrade, Serbia, ⁴Faculty of Pharmacy, University of Belgrade, Belgrade, Serbia.

CL-30. ID-44. BRAY-LIEBHAFSKY REACTION. DYNAMIC STATES WHEN TEMPERATURE IS THE CONTROL PARAMETER, J. Maksimović¹, M. Milenković¹, N. Pejić², D. Stanisavljev¹, S. Anić³, ¹ Faculty of Physical Chemistry, University of Belgrade, Belgrade, ²Faculty of Pharmacy, University of Belgrade, Belgrade, ³ChTM – Department of Catalysis and Chemical Engineering, Belgrade.

CL-31. ID-45. HYPOTHALAMIC-PITUITARY-ADRENAL (HPA) AXIS AS NONLINEAR SYSTEM WITH FEEDBACK, Lj. Kolar-Anić¹, Ž. Čupić², S. Jelić³, V. Marković¹, S. Maćešić¹, V. Vukojević⁴, ¹ Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia, ² Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Center of Catalysis and Chemical Engineering, Belgrade, Serbia, ³ Department of Theoretical Physics and Physics of Condensed Matter 020/2, Vinča Institute of Nuclear Sciences, University of Belgrade, Belgrade, Serbia, ⁴ Department of Clinical Neuroscience, Karolinska Institutet, CMM L8:01, 17176 Stockholm, Sweden

CL-32. ID-46. STOCHASTIC ANALYSIS OF MONOLAYER GAS ADSORPTION: THE USE OF BIVARIATE AND MONOVARIATE PROBABILITY GENERATING FUNCTION, O. Jakšić¹, Z. Jakšić¹, D. Randelović¹, Lj. Kolar-Anić², ¹ Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Belgrade, Serbia, ² Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia.

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October 4, 2012 at 8,30h-09,40 h, Contributed Lectures

Chairs: Ž. Čupić, Ana Ivanović-Šašić and S. Anić

CL-33. ID-47. ANALYSIS OF REAL SAMPLES BY PERTURBATION OF NON-EQUILIBRIUM STATIONARY STATES IN AN OSCILLATING REACTION, N. Pejić¹, S. Anić³, J. Maksimović², N. Sarap³, ¹Faculty of Pharmacy, University of Belgrade, Vojvode Stepe 450, 11000 Belgrade, Serbia, ²Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia, ³IHTM, University of Belgrade – Department of Catalysis and Chemical Engineering, Belgrade, Serbia, ⁴Institute of Nuclear Science Vinča, Radiation and Environmental Protection Department, University of Belgrade, Serbia

CL-34. ID-48. EMULSIONS AND DOUBLE EMULSIONS AS PARTICULAR EXAMPLES OF MEMRISTIVE SYSTEMS, A.M. Spasic, Institute for Technology of Nuclear and Other Mineral Raw Materials, Dept. of Chem.Engng. Belgrade, Serbia.

CL-35. ID-75. TYPES OF BIFURCATION POINTS IN BRAY-LIEBHAFSKY OSCILLATORY REACTION, B. Stanković¹, Ž. Čupić² and Lj. Kolar-Anić¹, ¹Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia, ²Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Department of Catalysis and Chemical Engineering, Belgrade, Serbia.

October 4, 2012 at 9,45h-10,25 h, Plenary Lecture

Chairs: Albert Luo, Mihailo Lazarević and K. (Stevanović) Hedrih

PL-11. ID-84. FRACTIONAL DERIVATIVE VISCOELASTIC MODELS IN THE WAVE THEORY OF IMPACT, Yury A. Rossikhin and Marina V. Shitikova, Research Center on Dynamics of Solids and Structures, Voronezh State University of Architecture and Civil Engineering, Voronezh, Russia

October 4, 2012 at 10,30h-11,10h, Special Presentation

Chairs: Tamara Nestorović, Ljiljana Kolar-Anić and Stevan Maksimović

SL-1. ID-70. DIGITIZATION OF SCIENTIFIC AND CULTURAL HERITAGE IN SERBIA, Žarko Mijajlović, University of Belgrade – Faculty of Mathematics, Belgrade, Serbia

Break 11,10h-12,00h

October 4, 2012 at 12,00h-12,40h, Contributed Lectures

Chairs: Alexander V. Rodnikov, Šefik M. Bajmak and Srdjan Jović.

CL-49. ID-61. COMPARATIVE ANALYSIS OF OPTIMAL SIZE WITH THE RESULTS EJECTORS EXPERIMENTAL EJECTORS TESTED IN DISTRICT HETING, Šefik M. Bajmak, University of Pristine, Faculty of Technical Sciences

CL-50. ID-68. NUMERICAL EVIDENCE OF COMPLEX NONLINEAR PHENOMENA OF THE BRAY-LIEBHAFSKY OSCILLATORY REACTION UNDER CSTR CONDITIONS, S. N. Blagojević¹, S. M. Blagojević², Ž. Čupić³, ¹Institute of General and Physical chemistry, Belgrade, ²Faculty of Pharmacy, University of Belgrade, Belgrade, ³ICHTM –Department of Catalysis and Chemical Engineering, Njegoševa 12, Belgrade

Break 12,50-13,00h

October 4, 2012 at 13,00h-13,40h, Round Table

Invitation for Chairs and Contribution Discussions: Slobodan Perović, Jaroslav Labat, Zoran Marković, Živorad Čeković, Hiroshi Yabuno, Pavel Krasilnikov, Marina V. Shitikova, Gradimir Milovanović, Žarko Mijajlović, K. (Stevanović) Hedrih.

Round Table: "Ethic of Scientists and Evaluation of Scientific Research Results".

October 4, 2012 at 13,40h-15,00h, Contributed Lectures

Chairs: Srdjan Jović, Ljiljana Veljović and Julijana D. Simonović

CL-36. ID-80. STOCHASTIC PARAMETRICALLY EXCITED HEREDITARY SANDWICH MULTI BEAM DYNAMICAL SYSTEMS, K. (Stevanović) Hedrih, Mathematical Institute SANU, Department of Mechanics, and Faculty of Mechanical Engineering University of Niš, Serbia.

CL-37. ID-79. HYBRID SYSTEM DYNAMICS ON LAYER WITH NONLINEAR ELASTIC AND INERTIA PROPERTIES, K. (Stevanović) Hedrih¹, M. Stamenković², N. Nešić², ¹Mathematical Institute SANU, Department of Mechanics, and Faculty of Mechanical Engineering University of Niš, Serbia, ²Mathematical Institute SANU, Department of Mechanics, Kneza Mihaila 36/III, Serbia,

CL-38. ID-22. SYSTEM OF DOUBLE THIN PLATES CONNECTED WITH LAYER OF ROLLING VISCO-ELASTIC NONLINEAR PROPERTIES, Julijana D. Simonović, Faculty of Mechanical Engineering, University of Niš, Niš, Serbia.

CL-39. ID-78. FORCED OSCILLATIONS OF A MEMBRANE ON NONLINEAR ELASTIC FOUNDATION, Nikola Nešić, Mathematical Institute SANU, Department of Mechanics, Belgrade, Serbia,

Break 15,00-16,30h

October 4, 2012 at 16,30h-19,10h, Contributed Lectures

Chairs: Srdjan Jović, Ljiljana Veljović and Julijana D. Simonović

CL-40. ID-59. VIBRO-IMPACT SYSTEM BASED ON OSCILLATOR WITH TWO HEAVY MASS PARTICLES ALONG HORIZONTAL ROUGH LINE, Srdjan Jović, **Vladimir Raičević**, Faculty of Technical Sciences, Kosovska Mitrovica, University of Priština- Kosovska Mitrovica, Serbia.

CL-41. ID-71. THE PHASE PORTRAIT OF THE VIBRO-IMPACT SYSTEM BASED ON OSCILLATOR, WITH THREE HEAVY MASS PARTICLES MOVING ALONG A ROUGH CIRCLE, Srdjan Jović, Vladimir Raičević, Faculty of Technical Sciences, Kosovska Mitrovica, University of Priština-Kosovska Mitrovica, Serbia,

CL-42, ID-39. ANALYSIS OF A RIGID BODY ROTATION AROUND TWO NON-INTERSECTING AXES – VECTOR METHOD AND PARAMETER ANALYSIS OF PHASE TRAJECTORIES, Ljiljana Veljović, Faculty of Mechanical Engineering University of Kragujevac, Kragujevac, Serbia.

CL-43. ID-33. THREE-PARAMETRIC TESTING OF SINGULARITY AND POSITION OF NON-LINEAR DYNAMICS RELATIVE BALANCE OF HEAVY MATERIAL PARTICLE ON ECCENTRICALLY ROTATING SMOOTH CIRCLE LINE, Marija Stamenković*, Marija Mikić**, *Mathematical Institute SANU, Department of Mechanics, Belgrade, Serbia, **Mathematical Institute SANU, Department of Mechanics, Belgrade, Serbia, and Faculty of Mathematics, Belgrade, Serbia.

CL-44. ID-49. OPTIMAL DESIGN OF THIN-WALLED AIRCRAFT STRUCTURES USING TWO-LEVEL OPTIMIZATION APPROACH, S. Maksimovic¹, K. Maksimovic² I. Vasovic³, ¹Military Technical Institute, Belgrade, Serbia, ²Republic Serbia, City Administration of City of Belgrade, Secretariat for Utilities and Housing Services Water Management, Belgrade, Serbia, ³Institute Goša, Milana Rakica 35, Belgrade, Serbia

CL-45. ID-18. OPTIMIZATION OF SANDWICH PLATES WITH PRISMATIC CORES, J. Djoković¹, K. Veljković², ¹Technical Faculty of Bor, University of Belgrade, Serbia, ²Polytechnical school Kragujevac, Kragujevac, Serbia

CL-46. ID-76. NONLINEAR FREE VIBRATIONS OF AN ELASTICALLY CONNECTED CIRCULAR DOUBLE-MEMBRANE COMPOUND SYSTEM (PART I), Milan Cajić, Danilo Karličić, Mathematical Institute SANU, Department of Mechanics. Belgrade, Serbia.

CL-47. ID-77. NONLINEAR FORCED VIBRATIONS OF AN ELASTICALLY CONNECTED CIRCULAR DOUBLE-MEMBRANE COMPOUND SYSTEM, Danilo Karličić, Milan Cajić, Mathematical Institute SANU, Department of Mechanics. Belgrade, Serbia.

* * * * *

October 5, 2012 at 8,30h-09,40 h, Contributed Lectures

Chairs: Stevan Maksimović and Zijah Burzić.

CL-51. ID-62. COMPATIBILITY OF ENDURANCE LIMIT AND FATIGUE CRACK GROWTH PARAMETERS IN BEHAVIOR OF WELDED JOINT OF LOW ALLOYED STEELS, Ivica Čamagić¹, Zijah Burzić², Nemanja Vasić¹, Srdan Jović¹, Slobodan Makragić¹, Predrag Živković¹, Faculty of Technical Sciences, University of Pristina, - Kosovska Mitrovica, Serbia, ²Military Institute of Techniques, 1 Ratka Resanovića Street, Belgrade, Serbia

CL-52. ID-64. CHARACTERIZATION OF ALLOYS AND LIQUIDUS PROJECTIONS OF THE TERNARY Bi-Cu-In SYSTEM, M. Premović and D. Minić,¹ The University of Pristina, Faculty of Technical Sciences, Kosovska Mitrovica, Serbia .

CL-53. ID-65. CHARACTERIZATION OF ALLOYS OF THE TERNARY Ag-Bi-Zn SYSTEM, D. Minić and M. Premović, The University of Pristina, Faculty of Technical Sciences, -Kosovska Mitrovica, Serbia

October 5, 2012 at 9,45h-10,25 h, Plenary Lecture

Chairs: H. Yabuno, Pavel Krasilnikov and Marina V. Shitikova

PL-12. PL-11. IF-14. HOMOGRAPHICAL SOLUTIONS OF HAMILTONIAN SYSTEMS AND COMPUTER ALGEBRA, E. Grebenikov¹, N. Zemtsova², Institution of Russian Academy of Sciences Dorodnicyn Computing Centre of RAS, Moscow, Russia

October 5, 2012 at 10,30h-11,10h, Contributed Lectures

Chairs: Stevan Maksimović and Zijah Burzić.

CL-54. ID-63. HIGH- TECH ARCHITECTURE AND SYNONYMS FOR A PREFABRICATED MODEL, Julija Aleksić, Faculty of Technical Sciences, Kosovska Mitrovica, University of Pristina - Kosovska Mitrovica, Serbia.

CL-55. ID-24. EXPERIMENTAL DEMONSTRATION OF HOMOCLIC CHAOS AND MIXED-MODE OSCILLATION, Syamal K.Dana, S.Chakraborty Central Instrumentation, CSIR-Indian Institute of Chemical Biology Jadavpur, Kolkata 700032, India e-mail: syamaldana@gmail.com/

CL- 56. ID-83.. METHODS OF RELIABILITY ASSESSMENT OF DAMAGED PIPELINE CORROSION, Živče Šarkoćević¹, Miodrag Arsić², Srdjan Jović³, Dragan Lazarević¹, High Technical School of Professional Studies, Zvečan, Serbia, ²Institute for Testing of Materials (IMS), Belgrade, Serbia, ³ Faculty of Technical Sciences, Kosovska Mitrovica, University of Pristina, Serbia,

Break 11,30h-12,00h

October 5, 2012 at 12,00h-12,40h, Plenary Lecture

Chairs: H. Yabuno, Pavel Krasilnikov and Marina V. Shitikova

PL-13. ID-81. PHENOMENOLOGICAL MAPPING AND MATHEMATICAL ANALOGY IN NONLINEAR DYNAMICAL SYSTEMS, K. (Stevanović) Hedrih¹,¹ Mathematical Institute SANU, Department of Mechanics, and Faculty of Mechanical Engineering University of Niš, Serbia,

October 5, 2012 at 12,40h-13,20h

Chairs: H. Yabuno, Albert Luo, Pavel Krasilnikov, Marina V. Shitikova, K. (Stevanović) Hedrih and Žarko Mijajlović.

Closing ceremony - Future in Nonlinear dynamics

Serbian Scientific Society
Symposium Nonlinear Dynamics – Milutin Milanković
Multidisciplinary and Interdisciplinary Applications
(SNDMIA 2012), Belgrade, October 1-5, 2012.
(Eighth Serbian Symposium in area of Non-linear Sciences)

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Symposium Non-linear Dynamics – Milutin Milanković
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IL-7. ID-57.

SOLITON DYNAMICS IN ONE-DIMENSIONAL WAVEGUIDE ARRAYS WITH SATURABLE, SELF-DEFOCUSING NONLINEARITY

M. Stepić¹, P. P. Beličev¹, A. Maluckov¹, I. Ilić¹, D. Kip², A. Kanshu², C.E. Rüter², V. Shandarov³

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ABSTRACT. The last two decades have witnessed a strong interest in periodic optical systems, such as waveguide arrays and photonic crystals [1, 2]. These systems exhibit many attractive features for which no counterpart exists in homogeneous media, including forbidden gaps in their transmission spectra [3], existence of strongly localized nonlinear modes (discrete and gap solitons) and the exciting possibility of controlling diffraction. One-dimensional waveguide arrays consisting of evanescently coupled parallel channels are fabricated in various photorefractive materials, including photovoltaic lithium niobate crystal possessing saturable self-defocusing nonlinearity [4] that is responsible for solitons' stabilization and their enhanced mobility [5]. We analyze both experimentally and theoretically soliton dynamics in two types of photonic lattices: in uniform waveguide arrays with locally introduced coupling defect [6, 7] and in more complex, binary lattices with alternating spacing between channels of constant width [8, 9]. Coupling defect interrupts the lattice periodicity and offer an additional physical mechanism for light confinement, acting as a waveguide in whose vicinity light can be confined, causing the existence of the so-called, defect modes inside the bandgaps. On the other hand, an extra periodicity opens an additional mini-gap where light propagation is again forbidden, thus allowing for extended nonlinear interaction of light with binary lattices and existence of novel, stable types of lattice solitons that may be potentially useful for the development of future all-optical photonic devices.

Keywords: nonlinearity, waveguide arrays, solitons

References

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- [2] Kivshar YuS, Agrawal GP, *Optical Solitons - From Fibers to Photonic Crystals*. San Diego: Academic Press, (2003).
- [3] Mandelik D, Eisenberg HS, Silberberg Y, Morandotti R, Aitchison JS, Band-Gap Structure of Waveguide Arrays and Excitation of Floquet-Bloch Solitons, *Physical Review Letters*, **90** (2003), pp. 053902.
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