Директору Математичког института САНУ
Проф. др Зорану Огњановићу
Научном већу Математичког института САНУ
Академику Проф. др Драгошу Цветковићу

Стручни извештај о учешћу међународној научној конференцији

NODYCON2019 held at Sapienza University of Rome, February 17-20, 2019

www.nodycon2019.org

.

The Conference aims to foster the tradition of the illustrious conference series that was originally launched by **Prof. Ali H. Nayfeh in 1986 at Virginia Tech as the Nonlinear Vibrations, Stability and Dynamics of Structures Conference**

Поштовани директоре, Проф. Огњановићу,
Поштовани председниче, Проф. Цветковићу,
Цењени чланови Научног Већа МИ САНУ,

У периоду од 17-20.02.2019. године учествовала сам у раду међународне научне конференције "NODYCON 2019 – First International Nonlinear Dynamics Conference" у организацији „Sapienza University of Rome“, у Риму, Италија.

Конференција је одржана на Факултету за грађевинарство и индустријско инжењерство (The Faculty of Civil and Industrial Engineering) у Риму.

Конференција "NODYCON 2019 – First International Nonlinear Dynamics Conference" у организацији „Sapienza University of Rome“ је **посвећена сећању и раду Prof. Ali H. Nayfeh-a** са Virginia Tech, а и као наставак серије конфернциеја **the Nonlinear Vibrations, Stability and Dynamics of Structures Conferencec,** чији је организатор био.

У оквиру конференције учествовала сам са излагањима у секцијама “A-**Concepts and Methods in nonlinear dynamics**“ и ''**D-Recent trends in Nonlinear Dynamics''** са радовима под називима:

Katica R. (Stevanović) Hedrih,(2019), **Vibro-impact dynamics of two rolling heavy thin disks along rotate curvilinear line and energy analysis, NODYCON 2019, Rome, Italy, First International Nonlinear Dnamics Conference, Book of abstracts, part** A -**Concepts and Methods in Nonlinear Dynamics,** Edited by NODYCON 2019 Programming Committee, PP. 29-30, Sapienza University of Rime - Springer, ISBN 978-88-944229-0-0. www.nodycon2019.org

Katica R. (Stevanović) Hedrih (2019)**, Independent fractional type modes of free and forced vibrations of discrete continuum hybrid systems of fractional type with multi-deformable bodies, NODYCON 2019, Rome, Italy, First International Nonlinear Dnamics Conference, Book of abstracts, part D- Recent trends in Nonlinear Dynamics,** Edited by NODYCON 2019 Programming Committee, PP. 709-710, Sapienza University of Rime - Springer, ISBN 978-88-944229-0-0. www.nodycon2019.org Саопштено на седници **Fractional order syst I.**

који су резултат мојих самосталних истраживања по истраживачким темама Пројекта ОН174001 ''Динамика хибридних система сложених стрзктура. Механика матеројала'', координираног од стране Математичког института САНУ.

Један сам од три коаутора следећа два рада:

Katica R. (Stevanović) Hedrih, Stanko V. Brčić and Stepa Paunović , (2019), Application of photoelasticity to some nonlinear dynamic problems and stress state analysis in dams: A brief overview inspired by the results of Prof. Vlatko Brčić, **NODYCON 2019, Rome, Italy, First International Nonlinear Dnamics Conference, Book of abstracts, part** A -**Concepts and Methods in Nonlinear Dynamics,,** Edited by NODYCON 2019 Programming Committee, PP. 17-18, Sapienza University of Rime - Springer, ISBN 978-88-944229-0-0. www.nodycon2019.org

Ivana D. Atanasovska, Katica R. (Stevanović) Hedrih and Dejan B. Momčlović,, (2019) A Theoretical Model for Vibro-impact Dynamics of Spur Gears with Tooth Flanks Wear, **NODYCON 2019, Rome, Italy, First International Nonlinear Dnamics Conference, Book of abstracts, part** A -**Concepts and Methods in Nonlinear Dynamics,** Edited by NODYCON 2019 Programming Committee, PP. 37-38, Sapienza University of Rime - Springer, ISBN 978-88-944229-0-0. www.nodycon2019.org

које су у одговарајућим секцијама области "A-Concepts and Methods in nonlinear dynamics" , саопштили, као **одговорни водећи аутори др Ивана Атанасовска, виши научни сарадник и Степа Пауновић, истраживач приправник, судент докторант**, ангажовани на истом пројекту ОН174001 и запослени по том основу у Математичком институту Српске академије наука и уметнсти. Садржаји ова два рада су такође резултат истраживања по одговарајућим темама Пројекта ОН174001. Оба рада су и у сарадњи и са коауторима са других пројеката Министарства.

У раду конференције имала сам част да будем и члан INTERNATIONAL ADVISORY COMMITTEE, као и да преседавам првом седницом под називом **Fractional order systems** од седница конференције у области **part D- Recent trends in Nonlinear Dynamics -** NODYCON 2019, зеједно са проф. **Карлом Пинто** из Португалије.

Двостранични проширени апстракти сва четири саопштења публиковани су у публикацији **Book of abstracts, NODYCON 2019, Rome, Italy, First International Nonlinear Dnamics Conference, part** A -**Concepts and Methods in Nonlinear Dynamics и part D- Recent trends in Nonlinear Dynamics,** са библиографским подацима наведеним уз радове.

Треба напоменутуи да је у раду конференције са радом **'' Simultaneous multi-parameter analysis of bone cell population model''** учествовала и **доцент др Јулијана Симоновић, доцент Машинског факултета из Ниша**, која је такође члан истраживачког тима Пројекта ОН174001 Динамика хибрисних система сложених структу. др Јулијана Симоновић је сада још на двогодишњем **ПОСТДОКТОРКОМ УСАВРШАВАЊУ на Cardiff University** у **Велсу, Велика Британија** и са радом којије резултат њеног ангажовању на

пројекту докторског усавршавања; улествовала је у секцији **BIOMECHANICS AND CAPSULE ROBOTS.**

На конференцији је изложено више од 350 радова, а учесници су били из преко 20 земаља света, са скоро свих континената.

У оквиру Конференције отварање и пленарна предавања су одржана у **ST. PETER IN CHAINS BASILICA**, док су остала предавања организована кроз паралелене сесије одржана на „The Faculty of Civil and Industrial Engineering, Sapienza University of Rome“. Све сесије су биле веома посећене, а организација ове велике конференције је била веома успешна захваљујући организационом тиму са Факултету за грађевинарство и индустријско инжењерство у Риму, предвођени, Председником организационог одбора Prof. **Walter Lacarbonara**, Editor-in-Chief часописа (M21a): **Nonlinear Dynamics, Springer**. Претходни уредник и оснивач овог часописа је преминули Prof. Ali H. Nayfeh-a са Virginia Tech-

На конференцији, смо били мали, трочлани, односно четворочлани тим успешних истраживача, део успешног тима са **Пројекта ОИ174001**, који смо чиниле **др Ивана Атанасовска, Степа Пауновић, др Јулијана Симоновић и ја.**

Поред радног дела програма, конференција је садржала и прилике за неформалне разговоре, сусрете са колегама из других земаља, али и успостављање нових контаката и размену идеја за будућа индивидуална или заједничка истраживања.

Боравак у Риму, млађе колеге, искористили су и за посету Музеју посвећеном Леонарду да Винчију, који садржи велики број реконструкција механизама, које је на својим цртежима приказао да Винчи. Ја сам имала рилику да све те експонате видим 2008 на изложби у Нишу, коју је рганизвала фабрика Филип Морис у свом изложбеном павиљону. У време трајања те изложбе, у Нишу је

боравио Професор Ђутепе Рега (Giuseppe Rega)са Универзитета Ла Сапиенза, као члан комисије за одбрану Магистарске теже сад др Јулијабе Симоновић, која је одбрањена 8 маја 2008. Тако да смо изложбу патената , конструкција и стваралачких дела Леонарда Да Бинчија посетили заједно профеор Рега и ја. Профедор Рега је био одушевљен да је видео ти изложбу уз коментар ''Ја то нисам видео у мом Риму'' а ја сам додала, ''али сте то видели у Нишу, царсском граду Наисусу, летњој резиденцији Константиа великог Римског императора''. Понедак се случајни догађаји тако сложе, да у иностранству човек види, оно што је део његове историје и његовог града.

Изложени радови са конференције, који су објављени у штампаној форми као проширени двостранични апстракти, прошли су процес рецензирања до прихватања за штампу у публикацији **Book of abstracts, NODYCON 2019, Rome, Italy.** Др Ивана Атанасовска и ја смо биле ангажоване и као рецензенти појединх апстраката из скупа ових двостраничних проширених апстраката.

Организатори су најавили могућност позивања појединих саопштења, у виду целих радова, за пост-конференцијеске публикације, специјални број часописа **Nonlinear Dynamics, Springer**, као и већи број томова зборника радова **NODYCON 2019 Springer Proceedings,** који је видљив на **SCOPUS-у.**

У прилогу Извештаја достављам: серију докумената из којих се закључује сва озбиљност научне селекције и највиши научни ниво научног програма ове интернационалне конференције NODYCON 2019.

У Београду, 9. маја 2019. године

Професор др Катица (Стевановић) Хедрих

****

ДОДАТАК:

Допуна стручног извештаја NODYCON 2019, Rome, Italy, First International Nonlinear Dnamics Conference,

Како сам , овај стручни извештај, решила да предам касније, по завршетку процеса позивања радова за пост-конференцијаке публикације и донетих коначних одлука, то могу да додам следеће:

Сва четири рада, три истраживача са пројекта ОН174001, изложена рада са конференције , **NODYCON 2019, Rome, Italy, First International Nonlinear Dnamics Conference**, који су објављени у штампаној форми, као проширени двостранични апстракти, у публикацији **Book of abstracts, NODYCON 2019, Rome, Italy,** позбани су и прихваћени за штампу за пост-конференцијске публикације и то три за **NODYCON 2019 Springer Proceedings,** који је видљив на **SCOPUS-y,** и један за специјални број часописа **Nonlinear Dynamics, Springer.**

Те пост-конференцијске публијације уређују екоте од по четири госта уредника са једним водећим уредником, а сви радиви су пролазили рецензије бар три групе рецензента. Сви радови су прошли процес рецензирања у више фаза, до коначног прихватања за штампу. Др Ивана Атанасовска и ја смо биле ангажоване и као рецензенти појединх целих радова из скупа ових радова позваних за публиковање у пост-конференцијским публикацијама у специјалним бројевима часописма, односно специјалним томовима **Springer Proceedings**-а.

Прихваћени радови су:

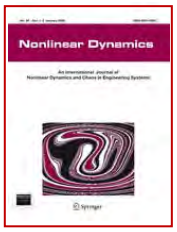
A* за **Springer Proceedings**

Katica R. (Stevanović) Hedrih (2019), Independent fractional type modes of free and forced vibrations of discrete continuum hybrid systems of fractional type with multi-deformable bodies, Springer Proveedings, 2019. (у штампи)

Katica R. (Stevanović) Hedrih, Stanko V. Brčić and Stepa Paunović , (2019), Application of photoelasticity to some nonlinear dynamic problems and stress state analysis in dams: A brief overview inspired by the results of Prof. Vlatko Brčić, Springer Proveedings, 2019**.** (у штампи)

Ivana D. Atanasovska, Katica R. (Stevanović) Hedrih and Dejan B. Momčlović,, (2019) A Theoretical Model for Vibro-impact Dynamics of Spur Gears with Tooth Flanks Wear, Springer Proveedings, 2019**.** (у штампи)

B* за специјални број часописа **Nonlinear Dynamics, Springer**



2* Kativa (Stevanovic) Hedrih , (2019)," **Vibro-impact dynamics of two rolling heavy thin disks along rotate curvilinear line and energy analysis**", **Nonlinear Dynamics, Springer** . in press, Submission NODY-D-18-02888R2; (M21a=10)\

DOI: 10.1007/s11071-019-04988-6

Овај рад је сада видљив на њеб сајту springer-a као First on line".

http://link.springer.com/article/10.1007/s11071-019-04988-6

У Београду, 9. маја 2019. године

Професор др Катица (Стевановић) Хедрих

****

GENERAL INFORMATION

The First International Nonlinear Dynamics Conference will be held at Sapienza University of Rome, February 17-20, 2019. NODYCON intends to foster the tradition of an illustrious conference series that was originally launched by Prof. A. H. Nayfeh in 1986 at Virginia Tech as the *Nonlinear Vibrations, Stability and Dynamics of Structures Conference*. NODYCON 2019 aims to provide a forum for researchers and practitioners to present, discuss and disseminate recent advances in nonlinear dynamics research reflecting the rich spectrum of topics covered by NONLINEAR DYNAMICS.

SCOPE

Papers dealing with one or more of the following topics will be considered for the conference:

- Multi-scale dynamics: coexistence of multiple time/space scales, large system dynamics
- Experimental dynamics: benchmark experiments, experimental methods, instrumentation techniques, measurements in harsh environments, experimental validation of nonlinear models
- Dynamics of structures/industrial machines/equipment/facilities (e.g., cable transportation systems, suspension bridges, cranes, vehicles, etc.)
- Composite and nanocomposite structures (e.g., carbon nanotube/polymer composites): damping, modeling, dynamics
- Adaptive, multifunctional and metamaterial structures
- Reduced-order modeling: center manifold reduction, nonlinear normal modes, normal forms
- Nonsmooth dynamics
- Systems with time and/or space delays
- Fractional-order system dynamics
- Nonlinear interactions: parametric vibrations with single/multi-frequency excitations, multiple external and autoparametric resonances in multi-dof systems
- Computational techniques: efficient algorithms, use of symbolic manipulators, integration of symbolic manipulation and numerical methods, use of parallel processors.
- Nonlinear system identification: parametric/nonparametric identification, data-driven identification
- NEMS/MEMS and nanomaterials: multi-sensors, actuators exploiting nonlinear working principles
- Multibody dynamics: rigid and flexible multibody system dynamics, impact and contact mechanics, tire modeling, railroad vehicle dynamics, biomechanics applications, computational multibody dynamics
- Fluid/structure interaction
- Influence of nonlinearities on vibration control systems
- Human-machine interaction
- Nonlinear wave propagation in discrete and continuous media
- Advanced cryptography based on chaotic maps
- Ecosystem dynamics, social media dynamics (user behavior dynamics in multi-messages social hotspots, prediction models), financial engineering, complexity in engineering
- Network dynamics (multi-agent systems, leader-follower dynamics, swarm dynamics, biological networks dynamics).

PRIZES

Springer sponsored prizes, named the ALI H. NAYFEH Prizes, in honor of the Journal's founding editor, the late Professor Ali H. Nayfeh, will be awarded for the best papers presented by graduate students. The prize for the first place is €500, for the second place € 400, and for the third place € 300. Referees will decide on the awards based on the quality of both the written paper and the presentation using the criteria of novelty, achievement, potential impact.

VENUE

The conference will be held at the Faculty of Engineering, downtown Rome, a few steps away from the Colosseum and the Forum sites, and from Cavour metro station. Termini station, the main railway station in Rome, is in a walking distance from the Faculty of Engineering. It can be reached from Fiumicino airport via Leonardo Express trains (http://www.trenitalia.com/tcom-en/Services/Fiumicino-Airport), a non-stop service that takes 32 minutes and runs every 15 minutes. The one-way ticket is €14.

PUBLICATION

The two-page abstracts to be written according to the template provided on the Conference website will be published in the Conference Book of Abstracts. Authors will have the option of having their full-length papers considered for publication in a Special Issue of NONLINEAR DYNAMICS (https://link.springer.com/journal/11071). To accelerate the reviewing process, referees will be invited from those who will attend the conference.

NODYCON2019 ORGANISING COMMITTEE

W. LACARBONARA (Sapienza University) S. LENCI (Marche Polytechnic University) A. LUONGO (University of L'Aquila) A. PAOLONE (Sapienza University)

A. ARENA
B. CARBONI
V. GATTULLI
G. RUTA
D. BERNARDINI
P. CASINI
G. QUARANTA
V. SETTIMI
A. BOCCAMAZZO
G. FORMICA (University of Roma Tre)
F. ROMEO
M. TALÒ

STEERING COMMITTEE

J. AWREJCEWICZ (Lodz University of Technology, Poland)
A. BAJAJ (Purdue University, USA)
B. BALACHANDRAN (University of Maryland, USA)
L. Q. CHEN (Shangai University, China)
F. L. CHERNOUSKO (Russian Academy of Sciences, Russia)
H. DANKOWICZ (University of Illinois at Urbana-Champaign, USA)
M. HAJJ (Stevens Institute of Technology, USA)
W. LACARBONARA (Sapienza University of Rome, Italy)
C. H. LAMARQUE (ENTPE, Lyon, France)
S. LENCI (Polytechnic University of Marche, Italy)
A. LUONGO (University of L'Aquila, Italy)
S. MASRI (University of Southern California, USA)
C. NATARAJ (Villanova University, USA)
S. NATSIAVAS (University of Thessaloniki, Greece)
F. PFEIFFER (Technische Universität München, Germany)
G. REGA (Sapienza University of Rome, Italy, Committee Chair)
S. SHAW (Florida Institute of Technology, USA)
F. VESTRONI (Sapienza University of Rome, Italy)
H. YABUNO (University of Tsukuba, Japan)
M. I. YOUNIS (KAUST, Saudi Arabia)

INTERNATIONAL ADVISORY COMMITTEE

M. AMABILI (McGill University, Canada)

K. ASFAR (Jordan University of Science and Technology, Jordan)

K. ALHAZZA, (Kuwait University, Kuwait)

J. M. BALTHAZAR (Federal University of Technology (UTFPR) , Brazil)

M. P. CARTMELL (University of Strathclyde, UK)

Y. CHEN (University of California, Merced, USA)

M. DAQAQ (NYU Abu Dhabi, United Arab Emirates)

M. DEFOORT (Valenciennes University, France)

P. EBERHARD (University of Stuttgart, Germany)

S. A. EMAM (American University of Sharjah, United Arab Emirates)

B. FEENY (Michigan State University, USA)

Y. GEORGIOU (National Technical University of Athens, Greece)

O. GOTTLIEB (Technion Israel Institute of Technology, Israel)

P. HAGEDORN (Technische Universität Darmstadt, Germany)

K. (STEVANOVIĆ) HEDRIH (Mathematical Institute of Serbian Academy of Sciences and Arts, Serbia)

T. KALMAR-NAGY (Budapest University of Technology and Economics, Hungary)

G. KERSCHEN (University of Liege, Belgium)

I. KOVACIC (University of Novi Sad, Serbia)

J. MA (Lanzhou University of Technology, Lanzhou, China)

L. MANEVITCH (Semenov Institute of Chemical Physics, Russia)

C. E. N. MAZZILLI (Universidade de Sao Paulo, Brazil)

A. METRIKINE (Delft University of Technology, Netherlands)

Y.V. MIKHLIN (National Technical University, Ukraine)

N. SRI NAMACHCHIVAYA (University of Waterloo, Canada)

J. NAPRSTEK (Czech Academy of Sciences, Czech Republic)

H. NIJMEIJER (Eindhoven University of Technology, Netherlands)

O. M. O'REILLY (University of California, USA)

J. H. PARK (Yeungnam University, South Korea)

R. PARKER (Virginia Tech, USA)

J.-S. PEI (University of Oklahoma, OK, USA)

F. PELLICANO (University of Modena, Italy)

N. PERKINS (University of Michigan, USA)

G. PICCARDO (University of Genova, Italy)

V. PILIPCHUK (Wayne State University, USA)

D. QUINN (University of Akron, USA)

J. RHOADS (Purdue University, USA)

A. P. SEYRANIAN (Moscow State Lomonosov University, Russia)

A. SHABANA (University of Illinois at Chicago, USA)

S. SINHA (Auburn University, USA)

A. STEINDL (Technical University of Wein, Austria)

G. STEPAN (Budapest University of Technology and Economics, Hungary)

J. A. TENREIRO-MACHADO (Polytechnic of Porto, Portugal)

S. THEODOSSIADES (Loughborough University, UK)

J. J. THOMSEN (Technical University of Denmark, Denmark)

C. TOUZE' (ENSTA Paristech, France)

A. VAKAKIS (University of Illinois at Urbana-Champaign, USA)

N. VAN DE WOUW (Eindhoven University of Technology, Netherlands)

F. VERHULST (University of Utrecht, Netherlands)

L. VIRGIN (Duke University, USA)

D. WAGG (University of Sheffield, UK)

J. WARMINSKI (Lublin University of Technology, Poland)

A.-M. WAZWAZ (Saint Xavier University, USA)

M. WIERCIGROCH (University of Aberdeen, UK)

PRIZES

Springer sponsored prizes, named the ALI H. NAYFEH Prizes, in honor of the Journal's founding editor, the late Professor Ali H. Nayfeh, will be awarded for the best papers presented by graduate students. The prize for the first place is €500, for the second place € 400, and for the third place € 300. Referees will decide on the awards based on the quality of both the written paper and the presentation using the criteria of novelty, achievement, potential impact.

PUBLICATION

The two-page abstracts to be written according to the template provided on the Conference website will be published in the Conference Book of Abstracts. Authors will have the option of having their full-length papers considered for publication in a Special Issue of NONLINEAR DYNAMICS (https://link.springer.com/journal/11071). To accelerate the reviewing process, referees will be invited from those who will attend the conference.

ALI H. NAYFEH PRIZES

Springer sponsored prizes, named the ALI H. NAYFEH Prizes, in honor of Nonlinear Dynamics's founding editor, the late Professor Ali H. Nayfeh, will be awarded for the best papers presented by graduate students and postdocs at the conference.

The Award ceremony is held during the Conference banquet at Brancaccio Palace, February 19, 2019. The prize for the first place is $500, for the second place $400, and for the third place $300. The Award Committee members decided on the awards based on the quality of the written paper using the criteria of novelty, achievement, and potential impact. Some of the papers were submitted to the NODYCON 2019 Special Issue of Nonlinear Dynamics and others to the NODYCON2019 Springer Proceedings.

For the 2019 Prizes, the Award Committee members are:

Prof. Muhammad Hajj (Stevens Institute of Technology, NJ, USA)

Prof. Stefano Lenci (Polytechnic University of Marche, Italy)

Prof. Hiroshi Yabuno (University of Tsukuba, Japan).

Professor Ali H. Nayfeh

Professor Emeritus of Nonlinear Dynamics

21 December 1933 – 27 March 2017

Participants of ***The tenth conference on Nonlinear Vibrations, Dynamics and Multibody Systems***, May 23-27, 2010, The Inn at Virginia Tech and Skelton Conference Centre Virginia Polytechnic Institute and State University, Blacksburg VA 24061

OPENING DAY – Sunday, February 17, 2019	
Conference Registration	2:00pm – 7:00pm
Welcome Reception	5:00pm – 7:30pm

DAY1 – Monday, February 18, 2019, Morning program	
Conference Registration	8:00am – 12:00pm

SITE FOR OPENING CEREMONY AND PLENARY SESSION:

ST. PETER IN CHAINS BASILICA

(NEXT TO THE FACULTY OF ENGINEERING)

DAY1 – Monday, February 18, 2019, Morning program, St. Peter in Chains Basilica	
OPENING CEREMONY	8:30am – 9:40am
Opening remarks by NODYCON2019 Chair, Prof. W. Lacarbonara	8:30am – 8:35am
A rapid fire lecture on *Michelangelo's Mose*	8:35am – 8:40am
Address by Magnificus Rector of Sapienza, Prof. E. Gaudio	8:40am – 8:50am
Address by City of Rome Council, President M. De Vito	8:50am – 8:55am
Address by Rector Delegate for Research and Innovation. Prof. T. Valente	8:55am – 9:00am
Past Engineering Dean and Chair of DISG Department, Prof. F. Vestroni	9:00am – 9:05am
Sapienza MuSa CONCERT Adagio e Allegro by *Wolfgang Amadeus Mozart* from Quartetto in Sol maggiore K80 "Quartetto di Lodi" Finale by *Antonin Dvorak* from Quartetto n. 12 in Fa maggiore op. 96 "Americano" **MuSa String Quartet:** Daniele Gorla e Giulia Liberatoscioli (Violins) Alessandro Mancuso (Viola) Antonello Rubini (Violoncello)	9:05am – 9:20am
TRIBUTE to Prof. Ali H. Nayfeh, chaired by Prof. G. Rega	9:20am – 9:40am
CLOSURE OF OPENING CEREMONY	9:40am

DAY 2 – Tuesday, February 19, 2019		2:00pm – 3:30pm
Recent trends in nonlinear dynamics **FRACTIONAL ORDER SYSTEMS I** Chair: K. Stevanović Hedrih, C. Pinto		Faculty of Engineering (Room **Volterra**)
K. Stevanović Hedrih	Independent fractional type modes of free and forced vibrations of discrete continuum hybrid systems of fractional type with multi-deformable bodies	2:00pm – 2:15pm
C. Ding, J. Cao, Y. Chen	Fractional-order model and experimental verification for broadband hysteresis in piezoelectric actuators	2:15pm – 2:30pm
C. Pinto, A. Carvalho	Analysis of a non-integer order model for the coinfection of HIV and HSV-2	2:30pm – 2:45pm
K. Liu, **Y. Chen**, P. Domanski	Control performance assessment of the disturbance with fractional order dynamics	2:45pm – 3:00pm
O. Brandibur, E. Kaslik, **D. Mozyrska**, M. Wyrwas	Stability and numerical solutions to the variable-order Caputo fractional difference equations with order values from (1; 2]	3:00pm – 3:15pm
T. He, J. Ma	The generalized electromagnetic-thermoelastic coupling problem of hollow cylindrical conductor based on the memory-dependent derivative	3:15pm – 3:30pm

DAY 3 – Wednesday, February 20, 2019

DAY 3 – Wednesday, February 20, 2019		8:30am – 10:00am
Concepts and methods in nonlinear dynamics **NONSMOOTH SYSTEMS III** Chair: J. Awrejcewicz, J.J. Thomsen		Faculty of Engineering (Room **Ljapunov**)
J. van Til, F. Alijani, W. Lacarbonara	Modeling nonsmooth end stop behavior of a tuned mass damper system under multi-harmonic excitations using Harmonic Balancing with alternating frequency/time	8:30am – 8:45am
A. Bhattacharjee, A. Chatterjee	Linear constraints, outward inequalities, and quadratic programming: a new general philosophy for restitution in impacts	8:45am – 9:00am
H. Xu, J. Ji	Creation of Neimark-Sacker bifurcation for a three-degree-of-freedom vibro-impact system with clearances	9:00am – 9:15am
K. R. Stevanovic Hedrih	Vibro-impact dynamics of two rolling heavy thin disks along rotate curvilinear line and energy analysis	9:15am – 9:30am
T. Yona, Y. Or	Theoretical analysis of wheeled three-link snake robot: singularities of nonholonomic constraints and stick-slip hybrid dynamics	9:30am – 9:45am
R. Lima, R. Sampaio	Stick-slip oscillations in an electromechanical system due to dry-friction	9:45am – 10:00am

DAY 2 – Tuesday, February 19, 2019		2:00pm – 3:30pm
Concepts and methods in nonlinear dynamics **MONITORING AND TESTING OF STRUCTURES** Chair: V. Gattulli, D. Bernardini		Faculty of Engineering (Room **Fermi**)
R. Sanchez Crespo, M.F. Daqaq	Influence of high-frequency excitations on the measurements of a quasi-static load cell	2:00pm – 2:15pm
F. Potenza, V. Gattulli, S. Nagarajaiah	Seismic response prediction of multiple base-isolated structures for monitoring	2:15pm – 2:30pm
K. Ringgaard, O. Balling	Operational modal analysis on a six degree of freedom parallel manipulator: reproducibility, excitation & pose dependency	2:30pm – 2:45pm
N. Barbieri, M. Mannala, R. Barbieri, G. Barbieri	Torsional analysis of transmission line cables	2:45pm – 3:00pm
M. Antonelli, B. Carboni, **D. Bernardini**, T. Kalmàr-Nagy, W. Lacarbonara	Quantifying the rate dependence of a nonlinear hysteretic device	3:00pm – 3:15pm
K. Stevanović Hedrih, S. Brčić, **S. Paunović**	Application of photoelasticity to the stress state analysis in dams: a brief review based on the results of professor Vlatko Brčić	3:15pm – 3:30pm

DAY 2 – Tuesday, February 19, 2019		2:00pm – 3:30pm
Concepts and methods in nonlinear dynamics **NONSMOOTH SYSTEMS II** Chair: R. Leine, A. Pirrotta		Faculty of Engineering (Room **Ljapunov**)
C. Budai, L.L. Kovács, J. Kövecses, G. Stépán	Combined effect of sampling and dry friction on positioning	2:00pm – 2:15pm
I. Atanasovska, K. Stevanović Hedrih, D. Momcilovic	A theoretical model for vibro-impact dynamics of spur gears with tooth flanks wear	2:15pm – 2:30pm
D. Li, C. Xu, M. Gola, D. Botto	Reduced-order modelling friction contact for cylinder-flat contact and experimental validation in an under-platform damper	2:30pm – 2:45pm
H. Tao, J. Gibert	Mechanical logic gates based on strictly biased responses of impact oscillators	2:45pm – 3:00pm
P.D. Spanos, **A. Di Matteo**, A. Pirrotta	Harmonic and random rocking of blocks on nonlinear flexible foundation	3:00pm – 3:15pm
H.Z. Horvath, D. Takacs	Analogue models of rocking suitcases and snaking trailers	3:15pm – 3:30pm

DAY 2 – Tuesday, February 19, 2019		10:30am – 12:30pm
Recent trends in nonlinear dynamics **BIOMECHANICS AND CAPSULE ROBOTS** Chair: Y. Liu, N. Bolotnik		Faculty of Engineering (Room **Fermi**)
R. Rusinek, M. Szymanski	Nonlinear effects in middle ear with active implant	10:30am – 10:45am
J. Simonovic	Simultaneous multi-parametric analysis of bone cell population model	10:45am – 11:00am
I. Breslavsky, M. Amabili	Nonlinear vibrations of a human aortic segment model with residual stresses	11:00am – 11:15am
D. Parshin, A. Lipovka, A. Yunoshev, A. Dubovoy, K. Ovsyannikov, A. Khe, A. Chupakhin	Nonlinear effects for the experimental results of human cerebral aneurysm tissue	11:15am – 11:30am
A. Nunuparov, F. Becker, N. Bolotnik, I. Zeidis, K. Zimmermann	Dynamics and control of a vibration-driven capsule robot with an opposing spring	11:30am – 11:45am
H. Fang, X. Zhan, J. Xu	Improving performance: recent progresses on vibration-driven locomotion systems	11:45am – 12:00pm
B. Guo, Y. Liu	Three-dimensional map for a vibro-impact capsule system	12:00pm – 12:15pm
B. Guo, J. Tian, **Y. Liu**, S. Prasad	Modelling of capsule-intestine pressure for a self-propelled capsule robot via experimental investigation	12:15pm – 12:30pm

DAY 1 – Monday, February 18, 2019		4:00pm – 5:00pm
Nonlinear dynamics and control **CONTROL OF NONLINEAR SYSTEMS I** Chair: F. Chernousko, F. Pfeiffer		Faculty of Engineering (Room **Fermi**)
F. Chernousko	Two- and three-dimensional motions of a body controlled by an internal movable mass	4:00pm – 4:15pm
N. Bolotnik, T. Figurina	Optimal control of a two-body limbless crawler along a rough horizontal straight line	4:15pm – 4:30pm
S. Tashakori, G. Vossoughi, H. Zohoor, N. van de Wouw	Suppression of axial-torsional vibrations in drilling system described by neutral-type delay differential equations	4:30pm – 4:45pm
A. Buscarino, **C. Famoso**, L. Fortuna, M. Frasca	Control of imperfect dynamical systems	4:45pm – 5:00pm

NODYCON

2019 Rome, Italy | First International Nonlinear Dynamics Conference

Book of Abstracts

Edited by the **NODYCON 2019** Program Committee

NODYCON 2019 fosters the tradition of the illustrious conference series that was originally launched by Prof. A. H. Nayfeh in 1986 at Virginia Tech as the Nonlinear Vibrations, Stability and Dynamics of Structures Conference.

NODYCON 2019 provides a forum for researchers and practitioners to present, discuss and disseminate recent advances in nonlinear dynamics research reflecting the rich spectrum of topics covered by the Springer journal Nonlinear Dynamics.

The topics addressed by the papers are organized in four major themes:

A Concepts and methods in nonlinear dynamics
B Nonlinear dynamics of mechanical and structural systems
C Nonlinear dynamics and control
D Recent trends in nonlinear dynamics.

Sapienza Università di Roma · Springer · COMSOL · Polytec · MTS

Under the Auspices of the City of Rome Council

ISBN 978-88-944229-0-0

NODYCON 2019

First International Nonlinear Dynamics Conference

Edited by
The NODYCON 2019 Program Committee
Department of Structural and Geotechnical Engineering
Sapienza University of Rome

Book of Abstracts of the First International Nonlinear Dynamics Conference, Rome, Italy, February 17-20, 2019

Sponsors:
Sapienza University of Rome
Faculty of Civil and Industrial Engineering
Department of Structural and Geotechnical Engineering

Springer Polytec MTS Systems Comsol

Under the Auspices of AIMETA and the City of Rome Council

NODYCON 2019

First International Nonlinear Dynamics Conference

NODYS Publications
Rome, Italy

Printed in Italy

ISBN No. 978-88-944229-0-0

HOW TO ORDER THIS BOOK

Color versions are also available on demand

Order by email: info@nodys.co.it

Web order: www.nodycon2019.org

NODYCON 2019
First International Nonlinear Dynamics Conference

Katica Hedrih

Mathematical Institute SASA
SERBIA

ISBN 978-88-944229-0-0

1 NODYCON 2019

CERTIFICATE OF ATTENDANCE

This is to certify that

Katica Hedrih

attended the **First International Nonlinear Dynamics Conference** held at Sapienza University of Rome, Faculty of Industrial and Civil Engineering, Rome, Italy, February 17-20, 2019.

Walter Lacarbonara
NODYCON 2019 Chair

Nonlinear Dynamics (NODY)<swetha.rajendran@springer.com>;

-----Original Message-----
From: Nonlinear Dynamics (NODY)
Sent: Thursday, May 02, 2019 5:29 PM
To: Katica R (Stevanovic) Hedrih
Subject: **Your Submission NODY-D-18-02888R2**

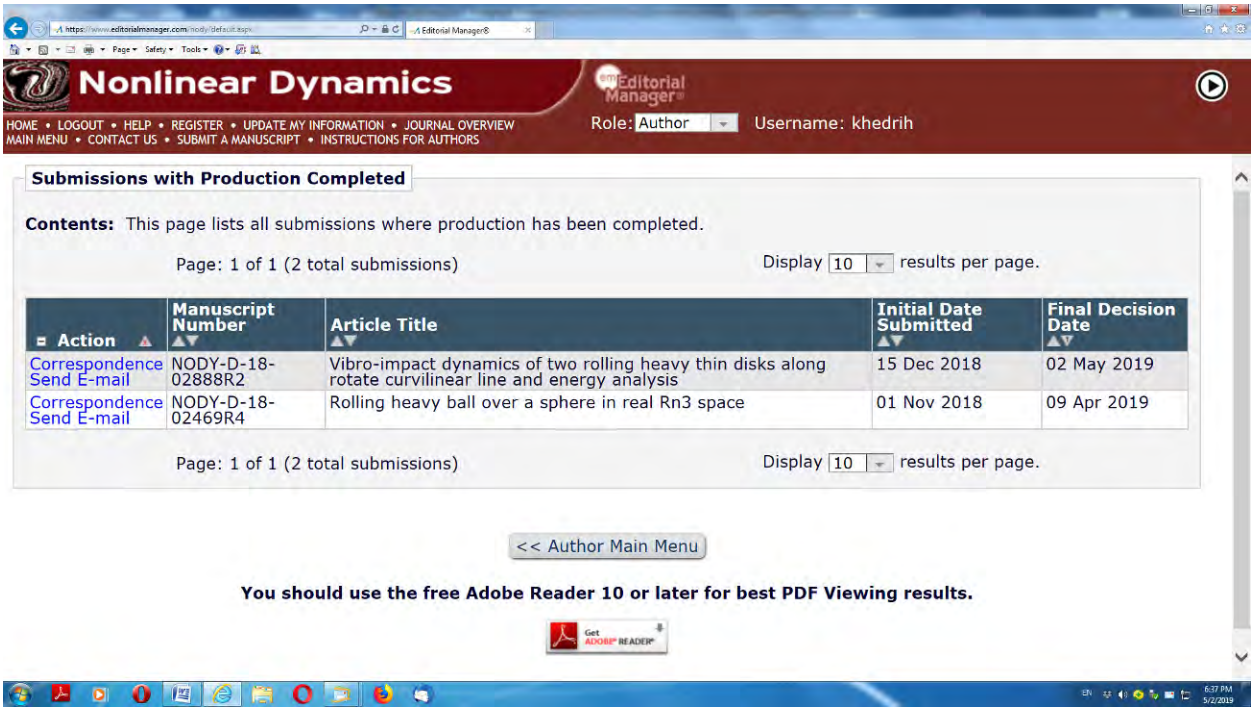
Dear Professor (Stevanovic) Hedrih,

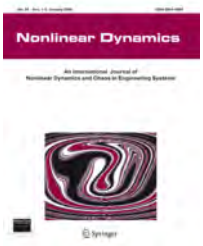
We are pleased to inform you that your manuscript,
"Vibro-impact dynamics of two rolling heavy thin disks along rotate curvilinear line and energy analysis", has been accepted for publication in Nonlinear Dynamics.

Please remember to quote the manuscript number**, NODY-D-18-02888R2**, whenever inquiring about your manuscript.

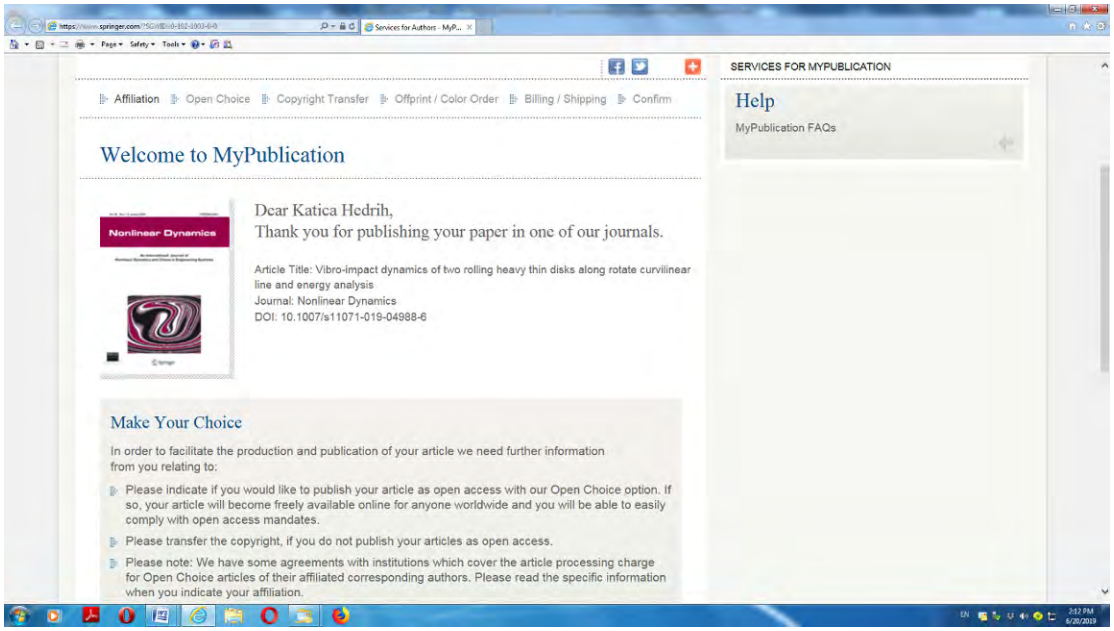
Thank you very much.

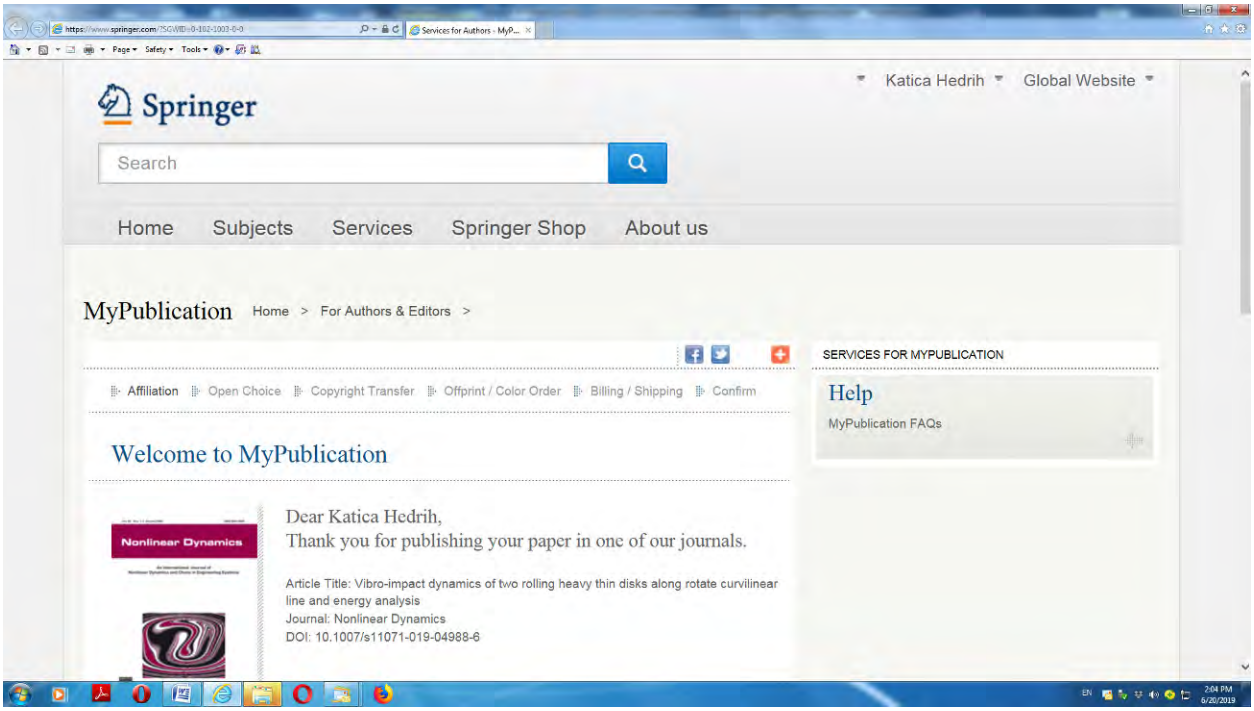
With best regards,
Angelo Luongo
Lead Guest Editor
Nonlinear Dynamics





Article Title: Vibro-impact dynamics of two rolling heavy thin disks along rotate curvilinear line and energy analysis
Journal: Nonlinear Dynamics
DOI: 10.1007/s11071-019-04988-6





Springer

Article Details

Journal title

Nonlinear Dynamics

Article title

Vibro-impact dynamics of two rolling heavy thin disks along rotate curvilinear line and energy analysis

DOI

10.1007/s11071-019-04988-6

Corresponding Author

Katica Hedrih

Copyright transferred to

Springer Nature B.V.

Transferred on

Thu Jun 20 14:31:34 CEST 2019

* * * *

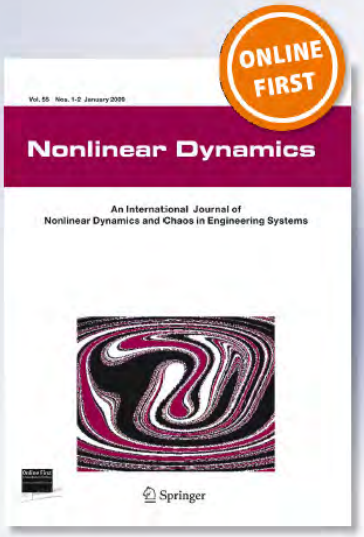
Vibro-impact dynamics of two rolling heavy thin disks along rotate curvilinear line and energy analysis

Katica R. (Stevanović) Hedrih

Nonlinear Dynamics
An International Journal of Nonlinear Dynamics and Chaos in Engineering Systems

ISSN 0924-090X

Nonlinear Dyn
DOI 10.1007/s11071-019-04988-6



Springer

Početak / SERVISI

Podaci o časopisu	
ISSN	0924-090X
Naslov	Nonlinear Dynamics
Skr. naslov (ISI)	NONLINEAR DYNAM

Rang časopisa u Journal Citation Report-u za period 1981-2017

	Starija godišta (1981 – 1992)									
«	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
oblast / impakt faktor	1.295	1.658	1.741	1.247	3.009	2.419	2.849	3.000	3.464	4.339
Engineering, Mechanical	30/105	17/116	14/122	29/122	5/125	15/128	7/130	8/132	10/130	8/128
Mechanics	44/112	24/123	25/133	51/132	5/135	11/139	8/137	8/135	8/133	8/134

Rang časopisa prema PETOGODIŠNJEM impakt faktoru 2007-2017

	Starija godišta (1981 – 1992)									
«	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
oblast / impakt faktor	1.758	1.784	1.776	1.438	2.640	2.424	2.637	2.915	3.313	3.906
Engineering, Mechanical	19/105	20/116	20/122	31/122	7/125	17/128	14/130	14/132	13/130	12/128
Mechanics	26/112	28/123	30/133	49/132	10/135	16/139	14/137	11/135	10/133	11/134

Objašnjenja

Nonlinear Dyn
https://doi.org/10.1007/s11071-019-04988-6

ORIGINAL PAPER

Vibro-impact dynamics of two rolling heavy thin disks along rotate curvilinear line and energy analysis

Katica R. (Stevanović) Hedrih

Received: 15 December 2018 / Accepted: 4 May 2019

Abstract Construction of the phase trajectory portraits of a generalized rolling pendulum along rotate curvilinear line is presented. The generalized rolling pendulum containing a rolling thin heavy disk rotates along the curvilinear line consisting of three circle arches, with constant angular velocity around a vertical eccentric/central axis. Depending on system parameters, different possible forms of the phase portraits appear with different structures of the sets of singular points and forms of phase trajectories. Trigger of coupled singular points and homoclinic orbit in the form of deformed number "eight" appears. A mathematical analogy between nonlinear differential equations of the considered generalized rolling pendulum and motion of the heavy mass particle along rotate curvilinear line, which are same form, is pointed out. On the basis of the obtained different possible phase trajectory portraits, nonlinear phenomena in vibro-impact dynamics of two rolling thin disks on rotate curvilinear line are investigated. Energy transfer between rolling disks in each of the series of successive collisions is analyzed and presented on relative mechanical energy portraits for dynamics of each of the rolling disks in collision.

Keywords Generalized rolling pendulum · New theory of the collision between rolling disks · Phase trajectory method · Vibro-impact dynamics · energy transfer

Preface

This paper is dedicated to Professor and important Scientist Aly *Nayfeh (December 21, 1933–March 27, 2017)*. My first meeting with Professor Aly Nayfeh, which I remember, was during the conference "*Asymptotics in Mechanics*" in 1996, organized in Saint Petersburg. My Professor, academician *Yuri Alekseevich Mitropolyski (January 3, 1917–January 14, 2008)*, known by asymptotic methods Krilov–Bogolyubov–Mitropolyski, invited me and introduced with Professor Aly Nayfeh. This was an honor for me, taking into account international scientific importance in area of nonlinear mechanics of these two important scientists. Numerous times in my hand was the monograph:

Aly Nayfeh, Dean T. Mook, (1976), Nonlinear Oscillations, John Wiley and Sons, 1976, New York, published first in 1976, but between numerous cited references in this monograph, I haven't read that my paper, published in Poland Journal in 1974, is included in this list of references. I forgot this paper published under my father's family name. In 2016, researcher from my cur-

Dedicated to memory of Professor and important scientist ALY NAYFEH (December 21, 1933-March 27, 2017).

Katica R. (Stevanović) Hedrih (✉)
Department of Mechanics, Mathematical Institute of the Serbian Academy of Science and Arts,
ul. Knez Mihailova 36/III, Belgrade 11000, Serbia
e-mail: katicah@mi.sanu.ac.rs; khedrih@eunet.rs; khedrih@sbb.rs

Katica R. (Stevanović) Hedrih
Faculty of Mechanical Engineering, University of Niš, ul. Vojvode Tamkosića 3/V/22, Niš 18000, Serbia

Published online: 27 June 2019

rent Project team ON174001 (2011–2019), informed me that my paper titled: *Stevanovich, K. (later merried family name Hedrih) and Raskovich D., (1974), Many frequency vibration in one frequency regime of nonlinear systems with several degrees of freedom, Zagadnienia Drgan Neiliniowych, 15, pp. 201-220;418.*, is cited in the list of the references of this important monograph. I have learned about this citation only after four decades late.

At the same time in 1976, my other two papers titled:

Katica Stevanovich (later merried family name Hedrih)m (1972), Two-frequency no stationary forced vibrations of beam, Marhematical Physics, Kiev, Vol. 12, 1972, pp. 127–140. (in Russian language)

Katica Stevanovich (later merried family name Hedrih), (1971), Transversal vibrations of a beam loaded by system, moving along beam with changeable velocity, containing mass particles each excited by corresponding single frequency force, Edition Asymptotic and qualitative methods in theory of nonlinear vibrations, Editor Yu.A. Mitropolyski, Institute of Mathema ics Academy of Sciences of USSR , Kiev, 1971, page 15. (in Russian language).

published in Ukraine, are cited in the list of the refe ences in the monograph, published in 1976, and title

Yu.A. Mitropolyski and B.I. Moseenkov: Asymptot solutions of partial differential equations , Kiev, 197 (in Russian language).

These three citations through list of the references i two important international monographs of two wor important scientists in area of nonlinear mechanic nonlinear oscillations represent a special honour f me. I was very pleased to learn about scientific rel tions and warm friendships between these two scie tists, *Aly Nayfeh* (December 21, 1933–March 27, 201 and Yuri *Alekseevich Mitropolyski* (January 3, 191 January 14, 2008), known over the world on the basis c their important scientific legates, life after long time u to numerous next generations of the young scientists

Participants of *The tenth conference on Nonlinear Vibrations, Dynamics and Multibody Systems*, May 23-27, 2010, The Inn at Virginia Tech and Skelton Conference Centre Virginia Polytechnic Institute and State University, Blacksburg VA 24061

My last meeting with Professor Ali Nayfeh was in 2010, during my participation in Conference Nonlinear Dynamics, organized by Professor Ali Nayfeh in Virginia. It was pleasant days during my participation in this Conference:

The tenth conference on Nonlinear Vibrations, Dynamics and Multibody Systems, May 23–27, 2010, The Inn at Virginia Tech and Skelton Conference Centre Virginia Polytechnic Institute and State University, Blacksburg VA 24061.

Our last communication was correspondence regarding my acceptance to write a special Reviewer's Reports of a manuscript submitted to Journal Nonlinear Dynamics.

It is nice to keep in memory, knowledge about two nice persons and important scientists as are Aly Nayfeh and Yuri Alekseevich Mitropolski were, one from USA and other from Ukraine, separated by 9 hours flight by airline, but so close by area of scientific interest and research.

1 Introduction

By using the phase plane method, the nonlinear phenomena in dynamics of vibro-impact system containing two rolling bodies along rotate circle, or along different stationary curvilinear line, are investigated and results are presented in author's Refs. [5–7,12]. By author, new established Hedrih's theory of the collision between two rolling bodies is published in Ref. [8] and applied in Refs. [5–7]. Two generalized rolling pendulums [5,13] along the same curvilinear trace are the main sub-system of each of previously investigated nonlinear dynamics of the vibro-impact systems. In previously listed published papers, energy analysis is done and the successive energy jumps, between two rolling bodies in successive collisions, are indicated.

The background of the considered problem and the realized research has important practical significance and applications. The primary importance is the knowledge of nonlinear dynamics of a generalized rolling pendulum along stationary or rotate curvilinear trace of rolling. Also, new theory of collision between rolling bodies with new expressions of outgoing angular velocity of rolling bodies after each collision on the stationary or rotate curvilinear rolling trace is important research results. Also, nonlinear phenomena, energy transfer between rolling bodies after each collision, and new extended methodology for investigation of nonlinear dynamics of a generalized rolling pendulum along curvilinear stationary or rotating curvilinear trace and vibro-impact dynamics are important elements of the basic knowledge for education of every future mechanical engineer.

The author's motives to investigate the dynamics of generalized rolling pendulums, i.e., the rolling dynamics of a body along curvilinear stationary or rotating paths are first inspired by the fact that these are suitable examples for university teaching in the field of dynamics and theory of oscillations, as well as nonlinear dynamics. But, it is not only for these aims and intensions. Rolling elements occur in many engineering machine systems.

In many engineering systems, rolling elements with collisions are also encountered. The author has come up with a theory of crash bumping, which defines expressions for the outgoing angular velocity of rolling after a collision.

For dynamic absorption of torsion oscillations, it is possible to use a number of rolling bodies in successive collisions around a shaft. The elements like that absorber are in the form of rolling bodies (balls) and in successive collisions. Dynamics of rolling balls are used for dynamical absorption of torsion oscillations shaft with gears or disks in rotation. It is an absorber of torsion oscillations using the useful vibro-impact dynamics of the bodies (balls) in rolling and successful collisions.

Also, in rolling bearings with rolling balls there are bodies that are in rolling and the dynamics of the vibrator can occur, especially in condition of damage and fatigue, the bearings that are the diameter of the harmful vibrating dynamics.

In this paper, the research attention is focused on nonlinear phenomena and energy analysis in dynamics of the vibro-impact systems containing two rolling thin disks, but along rotate curvilinear line trace, composed of three circle arches, with constant angular velocity along vertical axis.

2 Vibro-impact system description

Vibro-impact system, see Fig. 1, contains two generalized rolling pendulums each in the form of a thin heavy disk, which are in rolling motions, without slipping,

Acknowledgements Author is very grateful to reviewers and Guest Editors as well as to Editor-in-Chief of Journal, Walter Lacarbonara for the devoted time and effort to read and print all comments. Author expresses compliments to reviewers for expressed professional goodness in reading and understanding manuscript. Also, author is very grateful to young researcher and Ph.D student Stepa Paunovic, for valuable help in improvement in English of the manuscript.

Funding Project ON174001 "Dynamics of hybrid systems with complex structures.", partially supported by Ministry of Education, Science and Technology Republic of Serbia through Mathematical Institute of the Serbian Academy of Science and Arts, and Faculty of Mechanical Engineering University of Niš, as a researcher and Project leader without salary because is in age 75.

Compliance with ethical standards

Conflict of interest The author declare that he/she has no conflict of interest.

References

1. Andronov, A.A., Vitt, A.A., Haykin, S.: Teoriya kolebaniy, Nauka. Moskva., p. 568 (1981)
2. Coaplen, J., Stronge, W.J., Ravani, B.: Work equivalent composite coefficient of restitution. Int. J. Impact Eng. **30**, 581–591 (2004)
3. Guckenheimer, J., Holmes, P.: Nonlinear Oscillations, Dynamical Systems, and Bifurcations of Fields, p. 461. Springer, Berlin (1983)
4. Gerard, J., Daniel, J.: Elementary Stability and Bifurcation Theory. Springer, Berlin (1980)
5. Hedrih (Stevanović) K. R.: Vibro-impact dynamics of two rolling balls along curvilinear trace. In: Procedia Engineering, X International Conference on Structural Dynamics, EURODYN 2017, Edited by Fabrizio Vestroni, Francesco Romeo and Vincenzo Gattu, vol. 199, 1–3588 (2017). Elsevier (2017), pp. 663–668. https://doi.org/10.1016/j.proeng.2017.09.120. ISSN: 1877-7058
6. Hedrih (Stevanović) K. R.: Non-linear phenomena in vibro-impact dynamics: central collision and energy jumps between two rolling bodies. Dedicated to memory of Professor and important scientist Ali Nayfeh (December 21, 1933–March 27, 2017). Nonlinear Dynamics, February 2018, vol. 91, no. 3, pp. 1885–1907 (2018). https://doi.org/10.1007/s11071-017-3988-x
7. Hedrih (Stevanović) K. R.: Central collision of two rolling balls: theory and examples. Adv. Theor. Appl. Mech. **10**(1), 33–79 (2017). https://doi.org/10.12988/atam.2017.765
8. Hedrih (Stevanović) K. R.: Dynamics of impacts and collisions of the rolling balls, dynamical systems: theoretical and experimental analysis. In: Springer Proceedings in Mathematics & Statistics, vol. 182, Chapter 13, pp. 157–168. Springer, Part of Springer Science+Business, ISBN 978-3-319-42407-1. ISSN 2194-1009 ISSN 2194-1017 (electronic) (2017)
9. Hedrih (Stevanović) K. R.: Trigger of Coupled Singularities (Invited Plenary Lecture). In: Awrejcewicz, J., et al. (eds.) Dynamical Systems-Theory and Applications. Lodz 2001, pp. 51–78 (2001)
10. Hedrih (Stevanović) K. R.: A trigger of coupled singularities. MECCANICA **39**(3), 295–314 (2004). https://doi.org/10.1023/B:MECC.0000022994.81090.5f
11. Hedrih (Stevanović) K. R.: Nonlinear dynamics of a gyro-rotor, and sensitive dependence on initial conditions of a heavy gyro-rotor forced vibration/rotation motion, semi-plenary invited lecture. In: Chernousko, F.L., Fradkov, A.I. (eds.) Proceedings of COC 2000, IEEE, CSS, IUTAM, SPICS, St. Petersburg, Institute for Problems of Mechanical Engineering of RAS, 2000, vol. 2 of 3, pp. 259–266 (2000)
12. Hedrih (Stevanović) K. R.: Vibro-impact dynamics in systems with trigger of coupled three singular points: collision of two rolling bodies. In The 24th International Congress of Theoretical and Applied Mechanics (IUTAM ICTAM 2016), Montreal, Canada, 21–26 August, 2016, Book of Papers, pp. 212–213. IUTAM permanent site. ISBN: NR16-127/2016E-EPUB; Catalogue Number: 978-0-660-05459-9 (2016)
13. Hedrih (Stevanović) K. R.: Generalized rolling pendulum along curvilinear trace: phase portrait, singular points and total mechanical energy surface. In: Prokopenya, A., Gil-Swiderska, A. (eds.) Computer Algebra Systems in Teaching and Research. Publisher Siedlce University of Natural Sciences and Humanities (Siedlce, Poland), 2017, vol. VI, p. 204216. ISSN 2300-7397 (2017) http://www.castr.uph.edu.pl
14. Mitrinović, D.S., Djoković, D.Ž.: Special functions (Specijalne funkcije). Gradjevinska knjiga, Beograd, p. 267 (1964)
15. Petrović, M.: Elementi matematičke fenomenologije (Elements of mathematical phenomenology). Srpska kraljevska akademija, Beograd, str. 897 (1911). http://elibrary.matf.bg.ac.rs/handle/123456789/476
16. Petrović, M.: Fenomenološko preslikavanje (Phenomenological mapp). Srpska kraljevska akademija, Beograd, str. 33 (1933). http://elibrary.matf.bg.ac.rs/handle/123456789/475
17. Rašković, D.P.: Mehanika III—Dinamika (Mechanics III—Dynamics). Naučna knjiga, p. 424 (1972). http://elibrary.matf.bg.ac.rs/handle/123456789/3777; http://elibrary.matf.bg.ac.rs/search
18. Rašković, D.P.: Teorija oscilacija (Theory of oscillations). Naučna knjiga (1952). http://elibrary.matf.bg.ac.rs/handle/123456789/4754
19. Rašković, D.P.: Analitička mehanika (Analytical Mechanics). Mašinski fakultet Kragujevac (1974). http://elibrary.matf.bg.ac.rs/handle/123456789/3778

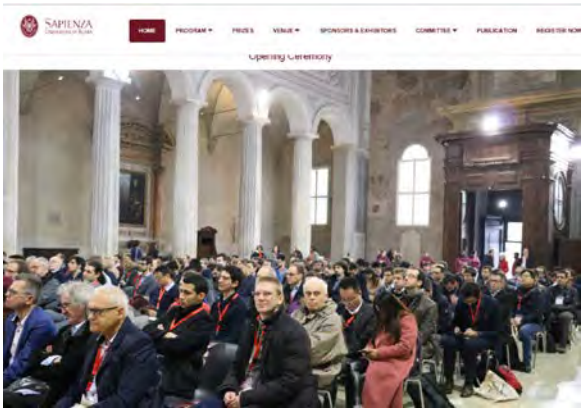
Conference Sites

St. Peter in Chains Basilica – February 18, 2019

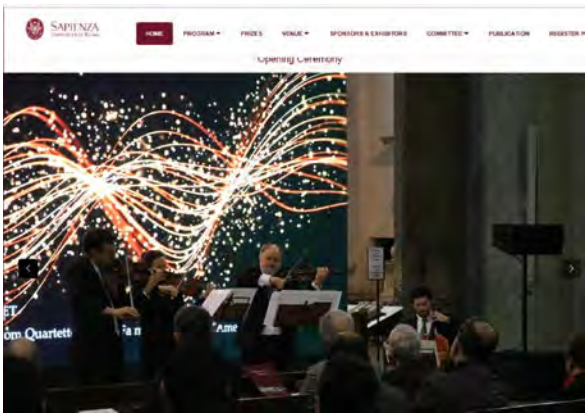
Opening Ceremony. The opening ceremony with a tribute to Prof. Nayfeh and the keynote lectures are held at St. Peter in Chains Basilica. The opening ceremony ends with a concert of the **Sapienza MuSa String Quartet.**

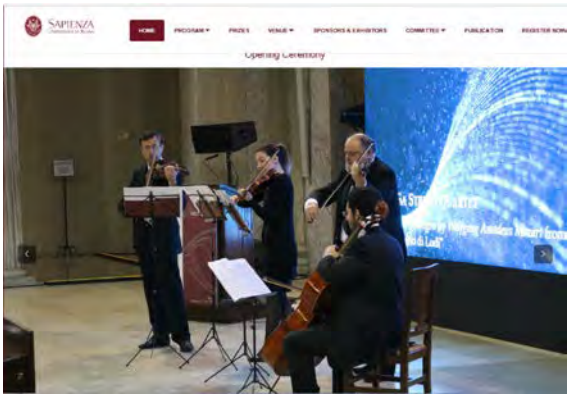
Faculty of Engineering – February 17 - 20, 2019

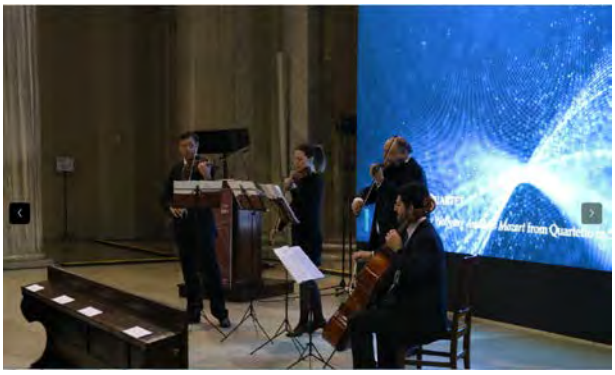
Welcome Reception & Technical Sessions. The technical sessions of the Conference are held at the Faculty of Engineering in a historical building downtown Rome, a few steps away from the Colosseum and the Forum sites.



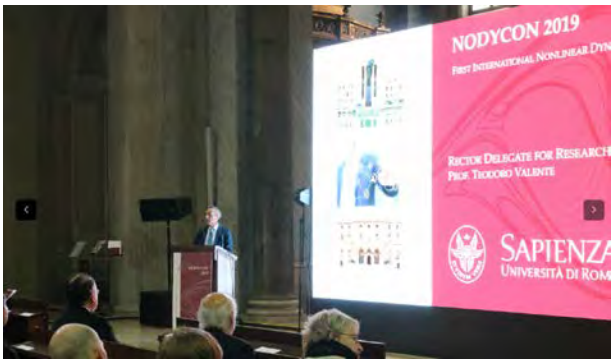
Registration

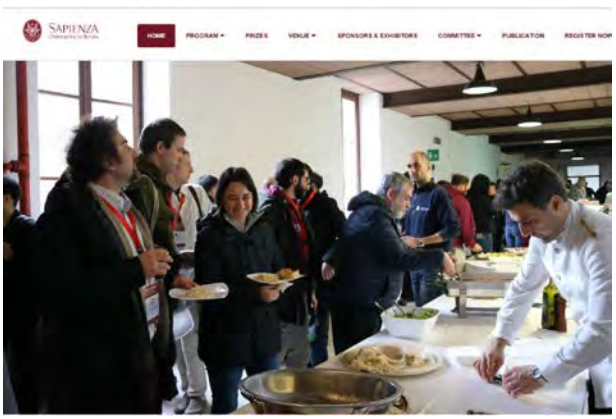







NODYCON 2019
SAPIENZA


NODYCON 2019
SAPIENZA

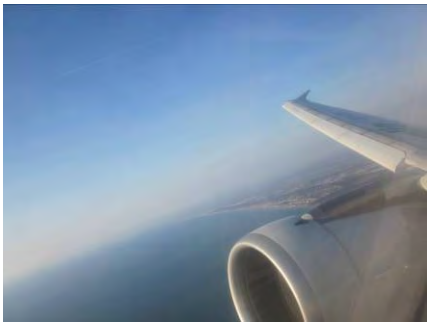

SAPIENZA
HOME
PROGRAM
PRIZES
VENUE
SPONSORS & EXHIBITORS
COMMITTEE
PUBLICATION

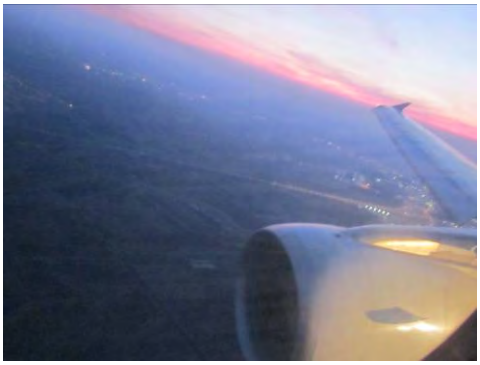

SAPIENZA
HOME
PROGRAM
PRIZES
VENUE
SPONSORS & EXHIBITORS
COMMITTEE
PUBLICATION

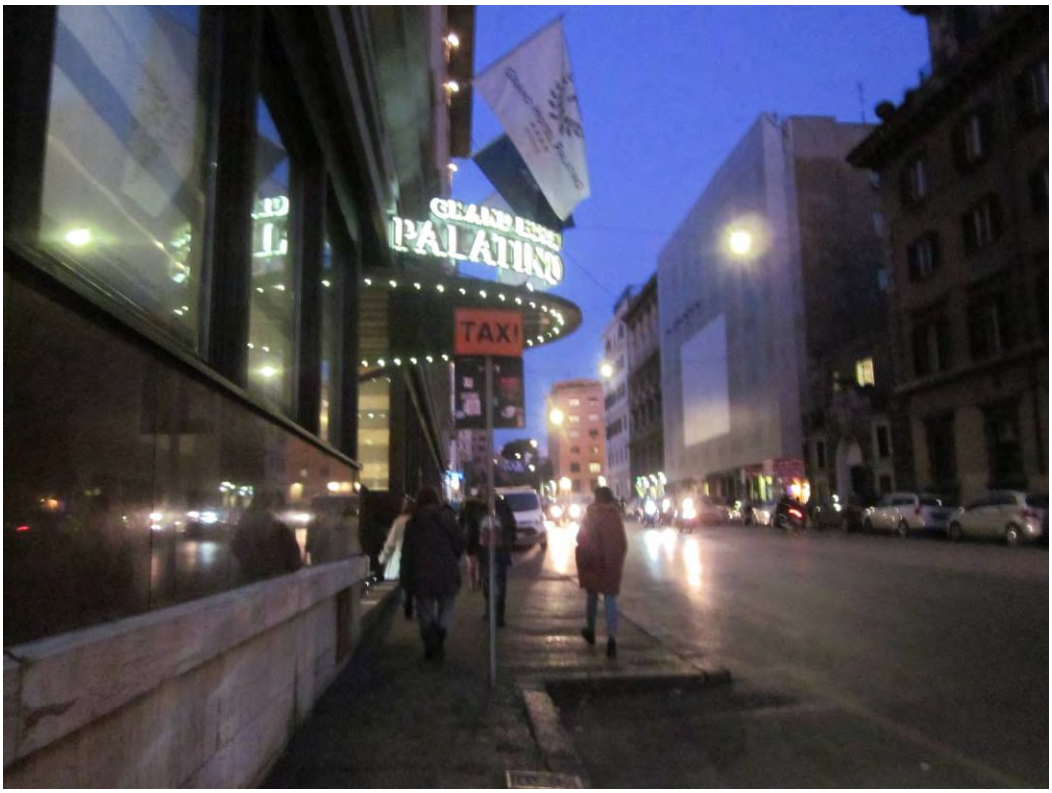

NODYCON
2019


MATHEMATICAL INSTITUTE
13 новембар 2017


NODYCON
2019
NODYCON
2019






PALATINO
TAX!