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Академику Проф. др Драгошу Цветковићу

Извештај

са учешћа на конференцији **"EURODYN 2017 – X International Conference on Structural Dynamics"** од 10.09. до 13.09.2017. године у Риму (Италија)

Поштовани,

У периоду од 10-13.09.2017. године учествовала сам у раду конференције "EURODYN 2017 – X International Conference on Structural Dynamics" у организацији: „European Association for Structural Dynamics“ и „Sapienza University of Rome“. Конференција је одржана на Факултету за грађевинарство и индустријско инжењерство (The Faculty of Civil and Industrial Engineering) у Риму.

У оквиру конфереције учествовала сам у раду Минисимпозијума **MS03** – **Nonlinear Dynamics,** организатори: Академик **Jiri Naprstek** (Institute of Theoretical and Applied Mechanics, Prague) и Професор **Giuseppe Rega** (Department of Structural and Geotechnical Engineering, Sapienza University, Rome). На Минисимпозијуму сам излагала рад са резултатима који су део истраживања у оквиру пројекта ОИ174001 координираног од стране Математичког института САНУ, под насловом:

Ivana Atanasovska, “Multi-body contact in non-linear dynamics of real mechanical systems”.

На конференцији је било укупно око 700 изложених радова, више од 800 аутора из скоро свих земаља Европе, али и са осталих континената. У оквиру Конференције одржана су три пленарна предавања и шест полупленарних предавања од стране веома угледних научника и професора у области динамике структура. Конференција је функционисала кроз 10 сесија које су се истовремено одржавале и обухватале једну општу сесију и 26 минисимпозијума. 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.

На конференцији сам била део малог али успешног тима са Пројекта ОИ174001, који смо чиниле Проф.Катица (Стевановић) Хедрих и ја. Поред радног дела програма, конференција је садржала и прилике за неформалне разговоре, успостављање нових контаката и идеја за будућа заједничка истраживања. Посебно желим истаћи да је била

веома посећена од стране младих истраживача, студената докторских студија, који су излагали делове својих докторских дисертација.

Изложени радови објављени су у штампаној форми као апстракти, као и у електронском зборнику радова у *специјалном броју часописа* **Procedia Engineering** *на линку: http://www.sciencedirect.com/science/journal/18777058?sdc=1.*

У прилогу Извештаја достављам: Копију Позивног писма о прихватању рада за усмено излагање, Копију Сертификата о учешћу на конференцији, Копију првих страна Књиге апстраката и Копију објављеног апстракта и неколико фотографија са одржане конференције.

С поштовањем,

У Београду, 21.09.2017.

др Ивана Атанасовска,
виши научни сарадник

Прилози:

EURODYN 2017 | X International conference on structural dynamics
Rome 10 - 13 sept

Roma 27/07/2017

Dr. Ivana Atanasovska
Associate Research Professor
Mathematical Institute of the Serbian Academy of Sciences and Arts
Kneza Mihaila 36, 11001 Belgrade
Serbia

Dear Dr. Ivana Atanasovska,

I am pleased to invite you to attend the *X International Conference on Structural Dynamics, EURODYN 2017*, to be held in Rome, from Sunday 10 to Wednesday 13 September 2017, at the Faculty of Civil and Industrial Engineering of Sapienza University of Rome for the oral presentation of your paper 264 entitled "Multy-body contact in non-linear dynamics of real mechanical systems".

I am looking forward to your forthcoming visit to Rome,

best regards,

Prof. Fabrizio Vestroni
Chair of EURODYN 2017

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EURODYN 2017
X International conference on structural dynamics
Rome 10 - 13 September

Founded EASD 1990

SAPIENZA
UNIVERSITÀ DI ROMA

Certificate of Attendance

This is to certify that

IVANA ATANASOVSKA

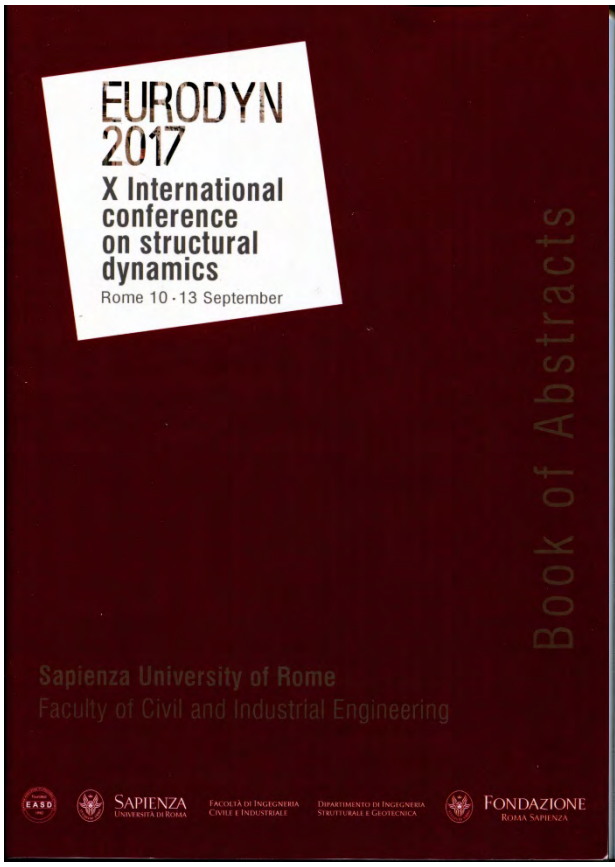
has attended the

Eurodyn 2017 - X International Conference on Structural Dynamics

Rome, Italy, 10-13 September 2017

September 13th 2017

Prof. Fabrizio Vestroni
Conference Chair



EURODYN 2017

X International Conference on Structural Dynamics

Book of Abstracts

Edited by:
Fabrizio Vestroni
Vincenzo Gattulli
Francesco Romeo

Rome, Italy
10 - 13 September 2017

www.eurodyn2017.it

Book of Abstracts of EURODYN 2017 - X International Conference on Structural Dynamics
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F. Vestroni, V. Gattulli, F. Romeo (eds.)

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chern@ipmnet.ru Progressive motion of a multibody system consisting of equal rigid bodies in a resistant medium is considered. The bodies are connected consecutively, and between each pair of bodies the actuators are installed. The actuators can exert forces upon the two neighboring bodies so that the distance between them can change within prescribed limits. It is shown that, under the influence of these internal forces produced by the actuators and external resistance of the medium, the system can move progressively with a velocity changing periodically. The algorithm of locomotion is proposed and justified. The necessary and sufficient condition is obtained that ensures the possibility of this motion. The cases of linear and quadratic isotropic/anisotropic resistance forces depending on the velocity of moving bodies and directed against this velocity, are analyzed. The locomotion described in the paper resembles the motion of worms and other biological objects.

Multi-body contact in non-linear dynamics of real mechanical systems

Ivana Atanasovska
Serbian Academy of Sciences and Arts, Serbia

The considerable number of real mechanical systems operates in conditions of multi-body contact. Very often, elastic properties in contact areas couldn't be neglected, so the elastic deformations exist in contact area of each two deformable bodies in contact. When there are two or more contacts at the same time and rotations and/or translations of contact bodies, these conditions cause the continuous changes of contact areas' geometry, friction, load distribution and other parameters. Therefore, the problem of non-linear dynamics of mechanical system becomes very complex. In this paper, the new approach for analyzing the non-linear dynamics of mechanical systems with multi-body contacts will be presented. In this approach, the contact bodies in mechanical systems are simulated with basic geometric deformable bodies coupled with elements with time-varying stiffness and damping. The main principles of mathematical phenomenological mapping are used for multi-body contact reduction to simple single-degree of few-degrees of freedom systems with total stiffness as main characteristic. The cases of two and three basic geometric bodies in contact are modeled to enable the investigation of influence of main parameters (stiffness, damping, external load, friction coefficient) in non-linear dynamics of multi-body contacts. The Finite Element Analysis is used to calculate the time-varying contact deformations, total stiffness and external load distribution. A particular attention is paid to the presentation of new approach application on real mechanical systems with multi-body contacts, such as gears and ball bearings. The analyses of non-linear dynamics of a particular gear pair and a particular ball bearing will illustrate the capabilities and advantages of presented new approach for comfortable and qualitative analysis of non-linear dynamic behavior of real complex mechanical systems.

An augmented Lagrangian formulation for the equations of motion of multibody systems subject to equality constraints

Elias Paraskevopoulos, Nikolaos Potosakis, Sotirios Natsiavas
Aristotle University, Greece

Some new theoretical and numerical results are presented on the dynamic response of a class of mechanical systems with equality motion constraints. At the beginning, the equations of motion of the corresponding unconstrained system are presented, first in strong and then in a weak form. Next, the formulation is extended to systems with holonomic and/or non-holonomic constraints. The formulation is based on a new set of equations of motion, represented by a system of second order ordinary differential equations (ODEs) in both the coordinates and the Lagrange multipliers associated to the motion constraints. Moreover, the position, velocity and momentum type quantities are assumed to be independent, forming a three field set of equations. The weak formulation developed was employed as a basis for producing a suitable time integration scheme for the systems examined. The validity and efficiency of this scheme was tested and illustrated by applying it to a number of characteristic example systems.

Closed dynamical model of a double propeller HAWT

Liubov Klimina[1], Ekaterina Shalimova[1], Marat Dosaev[1], Rinaldo Garziera[2]
[1]LMSU Institute of Mechanics, Russia,
[2]University of Parma, Italy

The mathematical model of a counter-rotating horizontal axis wind turbine is constructed. It is supposed that an electrical generator is connected


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MULTI-BODY CONTACT IN NON-LINEA
DYNAMICS OF REAL MECHANICAL
SYSTEMS
dr Ivana Atanasovska,
Mathematical institute of SASA, Belgrade, Serb
Project OI174001 Dynamics of hybrid systems w
complex structures. Mechanics of materials.
Leader Prof. Katica (Stevanovic) Hedrih