

**VIBRATIONS
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**Czesław CEMPEL, Marian W. DOBRY,
Tomasz STREK**

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IN PHYSICAL SYSTEMS**

2016

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Introduction to the Volume XXVII Collection of Papers of the Conference on Vibrations in Physical Systems – 2016

The phenomena of vibrations, oscillations and waves as physical phenomena are omni-present around us. They are the sign of life, the sign of the operation of machines and devices and they accompany any production processes. Their effects may be harmful, useful and they may also be a source of information on the technical condition of the supervised machines and devices. The successive Volume XXVII of Vibrations in Physical Systems published every second year deals with these widespread phenomena. It comprises the papers presented by specialists from our country but also from abroad at many sessions of XXVII Symposium of Vibrations in Physical Systems organized also every second year. The symposium has been organized since 1960 in Poznan by a local branch of the Polish Society of Theoretical and Applied Mechanics and the Institute of Applied Mechanics at Poznan University of Technology.

This conference is unusual one; we are present in a scientific space 27th times since 1960. This means the subjects we are dealing are still important and still brings the attention of scientific community and co working practitioners. One can say that each successive Volume is a special issue of some scientific Journal devoted mainly to vibration research. Of course, year by year our outlook is evolving; and the scope of current conference has been widened from the previous one, and is currently as follows:

- Mathematical Modelling in Sound and Vibration Analysis
- Experimental Techniques in Sound and Vibration Engineering
- Wave Problems in Solid Mechanics
- Analysis of the Non-Linear Deterministic / Stochastic Vibrations Phenomena
- Computational Methods in Vibration Problems
- Modelling and Identification of Dynamical Systems
- Signal Processing and Analysis
- Active Vibration Control
- Energy Methods in Vibration Engineering
- Vibration and Energy Problems Related to Biomechanics
- Dynamics of Machinery and Rotating Systems
- Vibroacoustics of Machinery, Diagnostics
- Vibrations and Noise of Transport Systems, Vehicles, Roads
- Structural Dynamics, Vibrations of Composite Materials Structures
- Vibration Problems in Environmental Engineering, Vibration of Granular Materials
- Vibrations and Dynamic Stability of Structural Elements, Beams, Plates, Shells
- Flow-induced vibrations, Fluid-structure interaction, Aeroelasticity
- Dynamic behaviour of Vibration Isolation Elements and Systems.

As it is seen the topics of the publications relate to a wide range of issues connected with modelling and identification of mechanical systems, their stability and dynamics of mechanical systems as well as physical phenomena such as propagation of acoustic waves and vibrations in all aspects of science and engineering, beginning from the theory and modelling up to the application subjects in machines, environment and the human body.

The monograph comprises also numerous presented publications relating to the issues of dynamics in biological as well as biological and mechanical systems. They mainly concern mechanical properties of a human body and its organs or parts. Other publications describe the dynamic interaction of power between man and machine (*Hand-held Powered Tools*) or distribution of power and the energy flow in Human-Machine Systems.

Many of the publications present the results of research carried out through simulation with the application of modern digital technologies worked out for the needs of solving linear and nonlinear issues of the dynamics of solid bodies or physical phenomena such as propagation of acoustic waves or dynamics and stability of complicated structures. The publications comprise the results that are analysed from the point of view of the applied methodology or the validity of the obtained data.

There are also some publications devoted to methods of passive, active and semi-active reduction of vibrations and noise and to modelling of vibrations damping with viscous damper. The publications concerning dynamic issues also analysed the stability of the tested mechanical systems.

Other significant publications concern the monitoring of technical facilities with the use of the propagation of elastic waves that allow us to detect cracks in the composite structure under the test and to specify their location.

All the papers comprised in this volume have been reviewed by members of the Scientific Committee, and in some cases by specialists outside the Committee, should the issues concern problems outside the scope of knowledge of the Committee members. We would like to thank all those persons who help us review papers in this published monograph and improve their quality.

Co-editors of the 27th Volume

Czesław CEMPEL
Marian W. DOBRY
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