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### **Power steering system body-modeling and analysis of its vibrations subsystems**

In the Gliwice Research Centre, the multiple problems of different models of vibrating beam systems analyzed by the structural numbers methods modelled by means of the graphs and hypergraphs have been solved. The discrete - continuous torsionally and flexibly vibrating mechanical and mechatronic systems were considered. In comparison to dynamical flexibilities only for mechanical flexibly vibrating beam, as a part of complex mechanical and/or mechatronic systems, exact method and approximate methods were used. In this paper, the hypergraphs methods have been used for modeling of mechanical subsystems – vibrating beams – of simply mechatronic subsystems of complex mechatronic systems. On the base of the obtained formulas, which were determined by the exact and approximate method, it is possible to make the analysis of the considered vibrating system by only approximate method. Taking into consideration, other boundary conditions of mechanical or mechatronic systems and other kinds of their vibrations, it is necessary to achieve other researches review in this paper. The problems will be presented in future works, because necessary conditions to synthesis of transverse vibrating mechanical or/and complex mechatronic systems must be obtained.

### **Biography**

Andrzej Buchacz has completed his MSc in Eng., (1974), PhD, (1979) and DSc (1992). He was an Academician of the Crimean Academy of Sciences (2011), is a Vice Head of Science of Institute of Engineering Processes Automation and Integrated Manufacturing Processes. He is an author or a co-author over 500 papers - 45 in reputed journals, 18 scientific books, eight promoted doctors. He is a laureate of many national and branch prizes and scientific distinctions. He was the Chairman of 2<sup>nd</sup> International Conference - Graphs and Mechanic, a Member of the Building Expertise in Science and Technology, Committees of International Conferences (PL, UA, RUS and RU), Machine-Builders International Union, Editorial Board International Journal, Development Technologies and Machine Building Systems (UA) and Machine Dynamics Problems (PL), an Editor in Chief of Publishing House at Silesian University of Technology, a Member of Vibroacoustic and Diagnostics Division of Machines and Systems at Ministry of Science and Information Education and Science, a Fellow of the World Academy of Materials and Manufacturing Engineering.

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