Archives of Control Sciences, **13**, (2), Polish Academy of Sciences

Editorial: Active noise and vibration control–Part I

Active Noise and Vibration Control (ANVC) are related techniques concerned with control (cancellation, attenuation or modification) of unwanted noise in the specified elastic-domain (air, water or solid flexible structure) using electro-mechanical devices. The idea of active control of noise was originated in the 1930s. However, recent research results in the fields of digital signal processing, control theory, system identification and development of digital signal processing hardware have made ANVC a truly practical tool. Now ANVC is a modern technology characterized by its high-technology components and increasing number of applications in many areas of scientific and engineering activities. The goal of this Special Issue of Archives of Control Sciences devoted to ANVC is to present some recent developments in this rapidly progressing research and application areas. The presented papers do not cover all topics that are currently being investigated by research groups throughout the world. The focus on fundamental and applied problems connected with application of control sciences in ANVC is given.

The Special Issue of Archives of Control Sciences on Active Noise and Vibration Control contains 17 papers: 1 survey, 5 devoted to active noise control and 11 devoted to active vibration control. The papers are divided into two volumes.

The first volume starts with the survey paper of Tokhi that provides the Reader with introduction into fundamentals and technology of ANVC with emphasis to adaptive active control. Basic control system structures of single-input-single-output and single-input multi-output types and corresponding algorithms are discussed. The study by Figwer presents a new look at on-line electro-acoustic plant model identification. The problem of on-line electro-acoustic plant model identification is discussed as a closed-loop identification with low signal-to-noise ratio and a new identification method based on multisine excitation is proposed. The next paper of Stein discuses hybrid feedback and feedforward analogue active vibration control for heavy loads on the basis of suspension system of a driver's seat. Gałkowski in his paper analyses the influence of structural friction on damping of torsion vibration in a shaft taking into account the structural friction between piezoelectric actuators and shaft. In the paper of Pawełczyk a hybrid analogue and digital noise control system for active headsets is presented. Efficiency of the proposed control system is verified on a prototype of the active headsets. Application of virtual unidirectional source of sound in active noise control for attenuation of noise in ducts is described in the paper of Bismor. The next paper, co-authored by Figwer and Czyż, presents a remotely controlled active noise control laboratory located at the Institute of Automatic Control, Silesian University of Technology, Gliwice, Poland. The laboratory is controlled over the Internet. In the paper of Ogonowski problems concerning limited authority adaptation in active noise control systems are discussed.

The contributions included into the second volume are devoted to active vibration control. They are extended versions of selected papers presented at the 6th Conference on Active Noise and Vibration Control Methods held in Cracow, Poland, in May 2003.

At the end of this preface the Guest Editors wish to express their gratitude to all Authors who contributed to this special issue. We also would like cordially thank Professor Antoni Niederliński, the Editor-in-Chief of Archives of Control Sciences, for his invitation to prepare this special issue and his endless patience during the compilation of this special issue.

Guest Editors

M. Osman Tokhi and Jarosław Figwer