



RECENT ADVANCES in SENSORS and SIGNALS

**Proceedings of the 1st WSEAS International Conference on
SENSORS and SIGNALS (SENSIG '08)**

Bucharest, Romania, November 7-9, 2008

Recent Advances in Electrical Engineering
A Series of Reference Books and Textbooks

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Preface

This book contains the proceedings of the 1st WSEAS International Conference on SENSORS and SIGNALS (SENSIG '08) which was held in Bucharest, Romania, November 7-9, 2008. This conference aims to disseminate the latest research and applications in Thermal Sensors, Classification of measurement errors, Sensor networks, Sensor Array and Multi-channel Processing, Parallel and Distributed Processing, Signal Processing for Control Systems and other relevant topics and applications.

The friendliness and openness of the WSEAS conferences, adds to their ability to grow by constantly attracting young researchers. The WSEAS Conferences attract a large number of well-established and leading researchers in various areas of Science and Engineering as you can see from <http://www.wseas.org/reports>. Your feedback encourages the society to go ahead as you can see in <http://www.worldses.org/feedback.htm>

The contents of this Book are also published in the CD-ROM Proceedings of the Conference. Both will be sent to the WSEAS collaborating indices after the conference: www.worldses.org/indexes

In addition, papers of this book are permanently available to all the scientific community via the WSEAS E-Library.

Expanded and enhanced versions of papers published in this conference proceedings are also going to be considered for possible publication in one of the WSEAS journals that participate in the major International Scientific Indices (Elsevier, Scopus, EI, ACM, Compendex, INSPEC, CSA see: www.worldses.org/indexes) these papers must be of high-quality (break-through work) and a new round of a very strict review will follow. (No additional fee will be required for the publication of the extended version in a journal). WSEAS has also collaboration with several other international publishers and all these excellent papers of this volume could be further improved, could be extended and could be enhanced for possible additional evaluation in one of the editions of these international publishers.

Finally, we cordially thank all the people of WSEAS for their efforts to maintain the high scientific level of conferences, proceedings and journals.

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Plenary Lecture I

On the Analytical Description of Asymmetric Hysteretic Loops



Professor Tudor Sireteanu

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Abstract: Hysteresis is a highly nonlinear phenomenon occurring in many disciplines involving system that possess memory, including inelasticity, electricity, magnetism etc. A wide variety of shapes of hysteretic loops can be portrayed by Bouc-Wen differential model. Usually, the mechanical hysteretic loops are obtained experimentally by imposing cyclic relative motion between the mounting ends on the testing rig of a material sample, structural element or vibration isolator and by recording the evolution of the developed force versus the imposed displacement. Due to the symmetry of Bouc-Wen differential equation with respect to the displacement input, the standard version of this model cannot be applied to describe asymmetric hysteretic loops. The asymmetry of experimental hysteretic curves is due to the asymmetry of the mechanical properties of the tested element, of the imposed cyclic motion, or of both factors. In this paper, the asymmetric hysteretic characteristics are modeled by matching the solutions of two different Bouc-Wen equations, corresponding to negative and positive values of the imposed cyclic displacement or by employing a modified Bouc-Wen model. The efficiency of the proposed approach is illustrated by its application to portraying the asymmetric hysteretic behavior of two vibration control devices.

Brief Biography of the Speaker: Dr. Tudor Sireteanu is the director of the Institute of Solid Mechanics of the Romanian Academy since 1990. He was born in 1943 in Bucharest. He is a graduate of the University of Bucharest, Faculty of Mathematics and Mechanics and has been with the Institute of Solid Mechanics since graduation, working in the field of vibration control. In 1971 he received a Fulbright Grant for a research stage at California Institute of Technology, Department of Engineering. In 1982, he received his PhD degree in applied mathematics from the University of Bucharest, Faculty of Mathematics and Mechanics with a thesis on nonlinear random vibrations. Since 1992 he is PhD advisor in the field of applied mathematics and associated professor with the University Politehnica Bucharest since 1997. His scientific work is focused on applied vibration theory, experimental methods and signal processing, the application of novel techniques such as semi-active control strategies assisted by computational intelligence methods (genetic algorithms, fuzzy logic and neural networks). Dr. Tudor Sireteanu was awarded the Romanian Academy Prize "Traian Vuia" (1998) for a series of papers published in the field of dynamic system control. In 2004 dr. Tudor Sireteanu received the title of Honorary Member of the Academy of Technical Sciences from Romania in recognition of his major contribution to the development of vibration control applied to automotive suspensions, machinery vibration isolation and building seismic protection. He has published more than 100 scientific papers in scientific journals and international conference proceedings and three books on automobile suspensions, magneto-rheological dampers and semi-active control. Dr. Tudor Sireteanu is the editor scientific secretary of the "Revue Romaine de Mécanique Appliquée", published by the Printing House of the Romanian Academy.