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FOREWORD

Special Section on Nonlinear Theory and its Applications

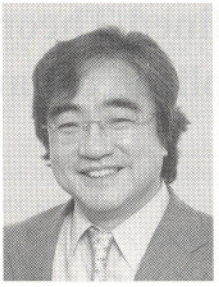
The research area on nonlinear phenomena is connected with various scientific and engineering fields. The international Symposium on Nonlinear Theory and its Applications (NOLTA Symposium) has been held over 15 years for the purpose of interchanging ideas of nonlinear studies developed in various fields including mathematics, simulation technologies, chaos, learning machines, brain studies, signal processing, communication theory and so on. The 2005 International Symposium on Nonlinear Theory and its Applications (NOLTA2005) was held in Bruges, Belgium in the period of October 18–21, 2005. NOLTA 2005 has been attended by 221 participants and 194 presentations were given. Many papers of this special Section are based on the talks presented at NOLTA2005 but papers which are not based on NOLTA2005 are also accepted. In fact, the call for papers was not only distributed to the attendants of NOLTA2005 but also to researchers who are interested in nonlinear theories through the web page of IEICE. We have received 44 submissions and 18 papers and one letter are accepted for publication. These papers present excellent research results on the field on functional analytic study on nonlinear systems, nonlinear circuits including Chua's circuit, analysis of chaos and oscillation, learning systems including state vector machine and neural networks, image analysis, nonlinear control and robotics.

The Guest Editors in Chief of this special Section would like express their sincerely thanks to all members of guest editorial board for their excellent handling of reviewing processes. Especially they thanks to Professor Yusuke Nakaya and Professor Kosuke Maruyama for their hard works as secretaries of this Section. Thanks are also due to Professor Yasunori Endo (Univ. of Tsukuba) and Professor Johan Suykens (Katholieke Universiteit Leuven) for their works as Guest Editors.

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Shin'ichi Oishi and Joos Vandewalle, Guest Chief Editors

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Shin'ichi Oishi *(Fellow)* born May 9, 1953, studied information and computer science at Waseda University. He won Ono-Azusa Prize from his school for the invention of generalized soliton solutions for soliton theory (bilinearization method). He received his Ph.D. in 1981 on the nonlinear extension of Fourier's method for soliton equations. Since 1980, he is a staff of Waseda University. Since 1989 he is professor at Waseda University. He has started to study verified numerical methods from 1990. He received the Best Paper Awards three times and the Hirose Award from IEICE, the Best Paper Award from JSAIM all on papers of numerical verification methods and the Okawa Publishing Prize for a publication of a book on verified numerical computation (in Japanese). Furthermore we won the Funai Computer Science Award for the achievements in numerical verification method. He was the Editor of this Transaction and the Editor of IEICE Transactions of Fundamentals (Japanese Edition) and is the president-elect of the Society of Fundamentals of IEICE, IEICE. He published well over 100 articles in scientific journals.



Joos Vandewalle *(Nonmember)* was born in Kortrijk, Belgium, in August 1948. He obtained the electrical engineering degree and a doctorate in applied sciences, both from the Katholieke Universiteit Leuven, Belgium in 1971 and 1976 respectively. From 1976 to 1978 he was Research Associate and from July 1978 to July 1979, he was Visiting Assistant Professor both at the University of California, Berkeley. Since July 1979 he is back at the Department of Electrical Engineering (ESAT) of the Katholieke Universiteit Leuven, Belgium where he is Full Professor since 1986 and the head of the SCD division at ESAT, that has more than 120 researchers. He is an Academic Consultant since 1984 at IMEC (Interuniversity Microelectronics Center, Leuven). From August 1996 to August 1999 and from August 2003 till February 2005 he was Chairman of the Department of Electrical Engineering. From August 1999 till July 2002 he was the vice-dean of the Faculty of Engineering at the Katholieke Universiteit Leuven. In the second semester of 2002–2003 he was on sabbatical leave at the I3S laboratory of CNRS Sophia Antipolis, France. From February 2005 on he is a member of the Governing Board of Exact Sciences at the K.U. Leuven. He teaches courses in linear algebra, linear and nonlinear system and circuit theory, signal processing and neural networks. His research interests are mainly in mathematical system theory and its applications in circuit theory, control, signal processing, cryptography and neural networks. His recent research interests are in nonlinear methods (support vector machines, multilinear algebra.) for data processing. He has authored or coauthored more than 300 international journal papers in these areas. He is the co-author of 4 books and co-editor of 5 books. He is a member of the editorial board of the International Journal of Circuit Theory and its Applications, Neurocomputing, Neural Networks and the Journal of Circuits Systems and Computers. From 1989 till 1991, he was associate editor of the IEEE Transactions on Circuits and Systems. He was Deputy Editor-in-chief of the IEEE Transactions on Circuits and Systems part I Fundamental theory and applications from January 2002 till December 2003. Since 2001 he is a member of the Advisory Board of the International Journal on Information Security (IJIS). He was program chairman of ISCAS 2000 in Geneva, and for IJCNN 2004 in Budapest. He was Chairman of the NOLTA conference in Bruges in 2005. He was elected fellow of IEEE in 1992 for contributions to nonlinear circuits and systems and in 2006 as Vice-President Technical Activities of the IEEE CAS Society. In 1991–1992 he held the Francqui chair on Artificial Neural Networks at the University of Liège and in 2001–2002 he held this chair on Advanced Data Processing techniques at the Free University of Brussels. He is also Fellow of the IEE (UK). He received several best paper awards and research awards. He is a member of the Academia Europaea and of the Belgian Academy of Sciences and its CAWET committee on engineering and of 2 committees of the Fonds voor Wetenschappelijk Onderzoek Vlaanderen (Belgium). He is a member of the Technology Committee of the Vlaamse Raad voor WetenschapsBeleid (VRWB).