

Special issue on Intelligent Information Processing Technology in Structural Health Monitoring

Preface

The rapid development of the global and urban landscape continues to propel civil structures to new heights and spans, enhancing the role of structural engineers in assuring a safe and habitable built environment. The structural health monitoring (SHM), which refers to the use of in-situ, continuous or regular measurement and analyses of key structural and environmental parameters under operating conditions for the purpose of warning impending abnormal states or accidents at an early stage to avoid casualties as well as giving maintenance and rehabilitation advice, has been becoming one of the most popular research areas in engineering fields recently. An SHM system is in fact a synthetic application of various branches of engineering and science disciplines such as mechanical engineering, civil engineering, software engineering, computer science, information technology, etc. In the past decades, lots of SHM systems have been successfully devised, implemented and operated worldwide to monitor the structural performance and operational condition of various types of engineering structures. However, one problem arise gradually how to effectively deal with the huge and abundant measured data from a SHM system, thus to assess structural condition states. In view of this, intelligent information processing technology, which is a process of transforming the incomplete, imprecise, inconsistent and uncertain information into complete, precise, consistent and certain information, provides an approach and technology assurance to solve the above difficulties.

This special issue on *Intelligent Information Processing Technology in Structural Health Monitoring* aims to aggregate the latest research efforts contributing to theoretical, methodological and technological advances in the integration of various aspects of SHM applications within a broad range of disciplines. A total of 14 peer-reviewed papers have been presented in this special issue. Without a doubt, the papers reflect the state-of-the-art researches and developments of this subject. Some research topics towards this target include: sensor placement and optimization algorithms, noise smoothing technology and digital filter design, system identification and feature extraction algorithm, multi-sensor data fusion and mining technology, diagnostics and prognostics technology of structural components and systems, etc.

Finally, we would like to express our sincere appreciation to all the authors who have contributed their excellent work to this special issue. We would also like to express our whole-hearted thanks to the reviewers from around the world for their contributions in shaping this issue and to Prof. C.B. Yun, Editor-in-Chief of Smart Structures and Systems, for his kind initiative and guidance leading to success of this special issue. This work was jointly supported by the Science Fund for Creative Research Groups of the NSFC (Grant No. 51121005), the National Natural Science Foundation of China (Grant No. 51178083, 51222806), and the Program for New Century Excellent Talents in University (Grant No. NCET-10-0287).

Guest Editors:

Hong-Nan LI, Professor, Dalian University of Technology, China (hnli@dlut.edu.cn)
Jeong-Tae KIM, Professor, Pukyong National University, Korea (idis@pknu.ac.kr)
Ting-Hua YI, Professor, Dalian University of Technology, China (yth@dlut.edu.cn)