

Preface

Fulei Chu¹ and Andrew Ball²

¹Tsinghua University, China

²University of Huddersfield, UK

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Diagnostics and condition monitoring are aspects of a field of engineering that aims to manage the health of engineering machinery and structures, but which has increasing applicability to many other complex systems in the world from the medical care of people, through the reliability of supply chain logistics to the secure operation of a large and complex organisation. The management of health generally requires a number of sequential steps, which are usually as follows: the detection of any abnormality in the procedural operation of the system, the location of the abnormal behaviour within the system, an assessment of the severity of the abnormality and identification of the potential system vulnerabilities that result from it, a detailed diagnosis of the problem including the identification of its root cause, and finally a predictive assessment of the future prospects for the continued operation of the system, including any remedial action that should be taken to minimise impact and maximise continued operational performance.

Engineering systems and their equivalents are continuously increasing in capability and hence in complexity. They are also operating in a world which is ever more aware of the health, safety and environmental implications of their operation. Never before has the need been so great to ensure that machines, structures and other systems operate as efficiently as possible, with the risk of failure all but eliminated; and the key to this level of performance is highly capable monitoring and diagnostics.

The field of condition monitoring has its roots in the mid 19th century when engineers had the idea of using sound and vision to judge the abnormality of industrial revolution machines. Things have moved forwards a long way since then, spurred onwards by the advent of systematic research into engineering fault diagnostics that began in the 1970s. In the past half a century, with the help of the latest advances in mechanical engineering, electronics and computer science, international scholars have done a huge amount of enabling work in the development of signal acquisition and sensing technology, the understanding of failure mechanisms and their symptoms, the processing of signals and the extraction of condition-indicating features, the classification of condition and intelligent decision-making.

Research in the fields of dynamics, monitoring and diagnostics has never been stronger, more wide ranging or important. In recent years, the advent of Industry 4.0, along with the development of artificial intelligence and the concepts of big data, have enabled huge strides to be made in the sophistication, accuracy and reliability of engineering diagnostics, whether it be applied to complex machinery, structures or even people. It is this intensity of attention and research activity, along with the clear lack of a journal specially focused upon this field, that motivated the editors to establish the *Journal of Dynamics, Monitoring and Diagnostics* (the JDMD).

The JDMD is a Gold Open Access, peer-reviewed journal, published by Intelligence Science and Technology Press. The journal focusses on the theoretical, technological, and experimental aspects of fault diagnostics, condition monitoring and related dynamics. The editors have set the objective that the journal becomes an international academic journal of the very highest standard, and one which provides a prestigious platform for researchers and practitioners of fault diagnostics in all fields of engineering and beyond. Specifically, the journal intends to address new theories and methodologies in the following areas: (1) measurement and sensing, (2) fault dynamic modeling and analysis of failure mechanisms, (3) feature extraction, fault detection and severity assessment, (4) fault diagnostics, prognostics and health management, and (5) developments of signal processing tools for condition monitoring.

Finally, we would like to thank all of our readers, authors, reviewers, editorial board members and editorial staff; we would also like to extend our gratitude to the Intelligence Science and Technology Press, to Chongqing College of Architecture and Technology and Chongqing University of Technology, without whom it would not have been possible to launch this new journal. With the combined efforts of our editorial board, our international contributing authors and our worldwide reader base, we have no doubt that the JDMD will become the leading journal in the field of engineering diagnostics.