Special issue on errors / uncertainties in sensors for structural health monitoring

Preface

Research activities in the last few years have been focused on making use of the significant technological advances in sensing and communication technology to enhance safety measures in critical infrastructure. Although intensive development continues on innovative sensor systems, there are still considerable uncertainties in the output of various sensors and in the overall evaluation of the behavior of structures and of various civil engineering systems. In general, this may lead to contrasting results and two kinds of errors in a structural health monitoring (SHM) system. Type I errors, also referred to as ‘‘false positives’’, occur in SHM when the monitoring system flags the structure or part of the structure as damaged when in fact it is not. These sorts of errors often result in unnecessary inspection, repair, and/or replacement of structural elements. Type II errors, or ‘‘false negatives,’’ occur when structural damage is missed by the SHM system and can result in structural misbehavior, further structural damage, and/or catastrophic failure.

In the light of the above considerations, this special issue on “*Errors / uncertainties in sensors for structural health monitoring*” aims to aggregate the latest research efforts contributing to theoretical, methodological and technological advances in the field of the errors or uncertainties in sensors for SHM and its application. A total of 7 peer-reviewed papers have been presented in this special issue, among which paper 1 on sensor placement under uncertainties using optimization algorithm, papers 2-5 on noise identification, modeling and cleaning technology paper 6 on multi-sensor data fusion and mining technology in SHM applications based on experimental approaches, and paper 7 on structural condition assessment with uncertainties. Without a doubt, these papers reflect the state-of-the-art researches and developments of this subject.

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