

Preface

Special Issue on System Identification and Health Monitoring Using Filtering Techniques

The 2011 World Congress on Advances in Structural Engineering and Mechanics (ASME'11⁺) was held on 18-22 September 2011 in Seoul, Korea. The congress was organized by combining the existing International Conferences and series of new International Conferences. The mini-symposium entitled "System Identification and Health Monitoring Using Filtering Techniques" was placed in the technical program session WSE on 22 September. The scope of this mini-symposium focuses on current research activities on structural system identification methods and application to evaluate real structural health. Modeling and identification refer to the determination of analytical models for systems based on the observations and measurements of a system's responses. Under external loading, systems often show non-stationary dynamic characteristics. In case such as structural control, plant control, robotics, and aerospace problems, real time modeling is necessary to track the time-varying properties of the system. Efforts have been made to develop so-called adaptive model identification techniques to deal with this problem. The most often used has been the Kalman Filter. This is a recursive algorithm in time domain assuming system linearity and Gaussian distribution of system and observation uncertainties. To develop a general method being able to apply to nonlinear and non-Gaussian systems a lot of effort has been paid and recently starting from the boot strap method known as the particle filter method becomes popular in the engineering field. Applications and development new ideas not only in the particle filter method but also any kind of filtering techniques in time domain as well as in the frequency domain were the key aim of this mini-symposium in which the presentation of current issues and problems in system identification were expected. Eight papers included in this special issue composed of researches presented in our session and recruited that represent wide range of researches in the system identification and structural health monitoring. We hope that this special issue will provide the reader with broad overview in the system identification research field.

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