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A PROCEDURE FOR CONTINUES ESTIMATION OF SYSTEM INPUT FORCE AND STATES

A. Kazemi Amiri[1] and C. Bucher[2]

[1] Department of Electronic & Electrical Engineering, Wind Energy & Control Centre, University of Strathclyde, Glasgow, UK, abbas.kazemi-amiri@strath.ac.uk
[2] Faculty of Civil Engineering, Centre for Mechanics and Structural Dynamics, TU Wien, Vienna, Austria, christian.bucher@tuwien.ac.at

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In this contribution a procedure for continuous reconstruction of system input force, along with estimation of system states is presented. For the sake of online implementation, a sliding time-window is adopted. The system input force is initially recovered from acceleration response over a finite-length time-window, using regularization technique. Afterwards, the recovered input force is, if necessary, fine-tuned, and the system states are estimated by application of the Kalman filtering, in order to deal with measurement uncertainty and unknown actual initial conditions. The successive application of regularization and Kalman filtering removes the obstacle of the unknown initial conditions of the first time-window. The initial conditions of the next time-windows are, in fact, the system states at the end of the previous time step. In order to resolve response data incompleteness, the problem is projected onto modal coordinates, while system modal parameters and mode shapes can be achieved by means of output-only techniques. The application of the proposed method demonstrates the capability of the proposed method in continuous identification of system input and states of a weather station tower.