

Kalman Filter Design in Structural Identification with Unknown Excitation

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Abstract : This article is about first step of structural health monitoring by identifying structural system in the presence of unknown input. In the structural system identification, identification of structural parameters such as stiffness and damping are considered. In this study, the Kalman filter (KF) design for structural systems with unknown excitation is expressed. External excitations, such as earthquakes, wind or any other forces are not measured or not available. The purpose of this filter is its strengths to estimate the state variables of the system in the presence of unknown input. Also least squares estimation (LSE) method with unknown input is studied. Estimates of parameters have been adopted. Finally, using two examples advantages and drawbacks of both methods are studied.

Keywords : Kalman filter (KF), least square estimation (LSE), structural health monitoring (SHM), structural system identification

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