



E. Figueiredo, M.D. Todd, C.R. Farrar, E. Flynn

Autoregressive Modeling with State-Space Embedding Vectors for Damage Detection under Operational and Environmental Variability

Издательство DEStech Publications, Lancaster, 2010 год

Код: 10676

6 стр; формат: 23,5 x 16 см; библиографический список: 7 единиц
ISBN: 978-1-60595-024-2

A nonlinear time series approach is presented to detect damage in systems by using a state-space reconstruction to infer the geometrical structure of a deterministic dynamical system from observed time series response at multiple locations. The unique contribution of this approach is using a Multivariate Autoregressive (MAR) model of a baseline condition to predict the state space, where the model encodes the embedding vectors rather than scalar time series. A hypothesis test is established that the MAR model will fail to predict future response if damage is present in the test condition, and this test is investigated for robustness in the context of operational and environmental variability. The applicability of this approach is demonstrated using acceleration time series from a base-excited 3-story frame structure.

Ключевые слова:

Содержание.

Autoregressive Modeling with State-Space Embedding Vectors for Damage Detection under Operational and Environmental Variability