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Feasibility Study of Parameter Identification Method Based on Symbolic Time Series Analysis and Adaptive Immune Clonal Selection Algorithm

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ABSTRACT

The feasibility of a parameter identification method based on symbolic time series analysis (STSA) and the adaptive immune clonal selection algorithm (AICSA) is studied. Data symbolization by using STSA alleviates the effects of harmful noise in raw acceleration data. The effect of the parameters in STSA is theoretically evaluated and numerically verified. AICSA is employed to minimize the error between the state sequence histogram (SSH) that is transformed from raw acceleration data by STSA. The proposed methodology is evaluated by comparing it with AICSA using raw acceleration data. AICSA combining STSA is proved to be a powerful tool for identifying unknown parameters of structural systems even when the data is contaminated with relatively large amounts of noise.

KEYWORDS

Structural Health Monitoring; Clonal Selection Algorithm; Symbolic Time Series Analysis; Adaptive Immune; Building Structures

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