



Код: 10352

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Damage Assessment Using Hyperchaotic Excitation and Nonlinear Prediction Error

Издательство DEStech Publications, Lancaster, 2011 год

8 стр; формат: 23,5 x 16 см; библиографический список: 12 единиц
ISBN: 978-1-60595-053-2

The idea of damage assessment based on using a steady-state chaotic excitation and state space embedding, proposed during the recent few years, has led to the development of a computationally feasible SHM technique based on comparisons between the geometry of a baseline attractor and a test attractor at some unknown state of health. This study explores an extension to this concept, namely a hyperchaotic excitation. The feature that is used to analyze the responses of the structures to the chaotic/hyperchaotic excitations is called 'Nonlinear Auto-Prediction Error' (NAPE), which is based on attractor geometry. A comparison between the results from the chaotic excitation with the results from each of the hyperchaotic excitations, obtained both numerically and experimentally, highlights the higher sensitivity of hyperchaotic excitations relative to a chaotic excitation.

Ключевые слова:

Содержание.

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