عنوان مقاله:

Experimental and finite-element free vibration analysis and artificial neural network based on multi-crack diagnosis of non-uniform crosssection beam

محل انتشار:

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خلاصه مقاله:

Crack identification is a very important issue in mechanical systems, because it is a damage that if develops may cause catastrophic failure. In the first part of this research, modal analysis of a multi-cracked variable cross-section beam isdone using finite element method. Then, the obtained results are validated usingthe results of experimental modal analysis tests. In the next part, a novel procedure is considered to identify the locations and depths of cracks in themulti-cracked variable cross-section beam using natural frequency variations of the beam based on artificial neural network and particle swarm optimizationalgorithm. In the proposed crack identification algorithm, four distinct neural networks are employed for the identification of locations and depths of both cracks. Back error propagation and particle swarm optimization algorithms areused to train the networks. Finally, the results of these two methods are evaluated.

کلمات کلیدی:

Modal analysis, Multiple crack identification, Variable cross section beam, Artificial neural network

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