

Model Updating-Based Approach for Damage Prognosis in Frames via Modal Residual Force

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Abstract : This paper presents an effective model updating strategy for damage localization and quantification in frames by defining damage detection problem as an optimization issue. A generalized version of the Modal Residual Force (MRF) is employed for presenting a new damage-sensitive cost function. Then, Grey Wolf Optimization (GWO) algorithm is utilized for solving suggested inverse problem and the global extremums are reported as damage detection results. The applicability of the presented method is investigated by studying different damage patterns on the benchmark problem of the IASC-ASCE, as well as a planar shear frame structure. The obtained results emphasize good performance of the method not only in free-noise cases, but also when the input data are contaminated with different levels of noises.

Keywords : frame, grey wolf optimization algorithm, modal residual force, structural damage detection

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