عنوان مقاله:

A TWO-STAGE METHOD FOR DAMAGE DETECTION OF LARGE-SCALE STRUCTURES

محل انتشار:

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خلاصه مقاله:

A novel two-stage algorithm for detection of damages in large-scale structures under static loads is presented. The technique utilizes the vector of response change (VRC) and sensitivities of responses with respect to the elemental damage parameters (RSEs). It is shown that VRC approximately lies in the subspace spanned by RSEs corresponding to the damaged elements. The property is leveraged in the first stage of the proposed method by seeking RSEs whose spanned subspace best contains the VRC. Consequently, the corresponding elements are regarded as damage candidates. To alleviate the exploration among RSEs, they are first partitioned into several clusters. Subsequently, discrete ant colony optimization (ACO) is utilized to find the clusters containing the RSEs of damaged elements. In the second stage of the algorithm, damage amounts for the restricted elements are determined using a continuous version of ACO. Two numerical examples are studied. The results illustrate that the method is both .robust and efficient for detection of damages in large-scale structures

کلمات کلیدی:

damage detection; large-scale structure; ant colony; sensitivity analysis; static analysis; system of equations