A new scenario-based approach to damage detection using operational modal parameter estimates - DTU Orbit (18/08/2019)

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In this paper a vibration-based damage localization and quantification method, based on natural frequencies and mode shapes, is presented. The proposed technique is inspired by a damage assessment methodology based solely on the sensitivity of mass-normalized experimental determined mode shapes. The present method differs by being based on modal data extracted by means of Operational Modal Analysis (OMA) combined with a reasonable Finite Element (FE) representation of the test structure and implemented in a scenario-based framework. Besides a review of the basic methodology this paper addresses fundamental theoretical as well as practical considerations which are crucial to the applicability of a given vibration-based damage assessment configuration. Lastly, the technique is demonstrated on an experimental test case using automated OMA. Both the numerical study as well as the experimental test case presented in this paper are restricted to perturbations concerning mass change.

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