

Robust Output-Only Modal Identification With Full-Field, High-Spatial-Dimensional Video Measurements

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High-fidelity characterization of structural dynamics has recently been made possible by the emerging full-field, high-spatial-resolution vibration measurement (i.e., very dense spatial measurement points) techniques using optical methods such as photogrammetry and laser vibrometers. However, a significant obstacle to tackle is output-only identification of high-spatial-resolution modal parameters, especially the determination of physical modes from spurious, because many modes are only weakly present in the noisy vibration measurements. In this study we present our recent work in developing a new non-parametric, unsupervised learning approach for robust output-only identification of high-spatial-dimensional modal parameters, by exploiting the full-field, high-spatial-resolution response measurement data from digital video cameras. We present experimental study about the performance of the new method and comparisons with a few existing methods and observe encouraging results. We also discuss its applicability and limitations for more complex dynamic structures.