

عنوان مقاله:

A NEW OUTPUT-ONLY MODAL SPACE FRAMEWORK TO IDENTIFY CLOSELY-SPACED MODES AND STRUCTURAL MASS DISTRIBUTION USING BLIND SOURCE SEPARATION

محل انتشار:

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خلاصه مقاله:

In recent years, the advent of output-only methods helps researchers to overcome the difficulties and costs of measuring input-motions during identifying structural systems. Blind Source Separation (BSS) is a prominent approach, which is based on output measurements of structure. Blind modal identification (BMI) is one of the byproducts of this method for structures when there is lack of information about inputs. In this paper, a new framework introduced to identify the modal properties of two various synthetic 3-dof structures. The first one is a 3-Dof system with relatively well separated natural frequencies and the second one is a 3-dof system with closely-spaced modes. The advantages of this newly introduced method for identifying closely spaced modes and also finding an accurate approximation of mass distribution matrix of whole structure, are presented in this article. This method is a combination of time-frequency-based BMI and the governing equations in modal space (modal equations and orthogonality). This approach only uses the free vibration portion of measured sensors (i.e. absolute accelerations) on structure at the end of earthquake excitation to get full information about modal characteristics of structure. However, it should be noted that the effects of noise on responses are waived. The BMI in time-frequency context was first applied by Ghahari et al. (2013) for structural identification. Their work was based on a time-frequency distribution (TFD) named Wigner Ville. This TFD Distribution plays a key role in BSS. That method of BSS works on sparse components analysis in time frequency (TF) domain. The method also needs the sources to be disjoint. The disjoint sources can be simply defined as sources, which are not mixed in TF domain and aligned along a special frequency .when they are mutually depicted in an identical plane of TF like figure1. They are usually without any overlap

کلمات کلیدی:

Output-Only System Identification, Blind Modal Identification (BMI), Time-Frequency Distribution (TFD), Mass Distribution Approximation, Closely-spaced mode

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