Modal shape identification of the vibration data of bridge dynamic test using fuzzy clustering,

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Abstract: The transmission of vibration to the adjacent buildings due to the traffic passing over Ghalemorghi Bridge in Tehran. has caused disruption to the inhabitants of the buildings. In order to investigate the vibration condition of the bridge, a dynamic loading test was performed and the output was analyzed using a non-parametric modal identification approach. In this article, the non-parametric modal identification algorithm from output measurement has been interpreted corresponding the clustering algorithm by subset relation with complex exponential basis functions on basis of soft computing paradigm. Moreover, the free vibration of bridge acceleration under the loading of a passing truck is processed by this identification method, and the acceleration vibration data integration in frequency region is performed by fuzzy clustering in order to determine the modal shape. Finally, vibration of the bridge elastic bearings and the similarity of the deck natural frequency to the vibration frequency of "Deck-Elastic bearing" system are recognized as two major problems of the bridge. (C) ٢٠١٠ Elsevier Ltd. All rights reserved.

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