Damage Detection Of Structures Under The Effects Of Outlier Measurements And Changing Environmental Conditions

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Damage detection of structures is affected by the changing environmental conditions the structures face, and by the presence of outlier measurements. In the literature, several methods have been developed to tackle the environmental problem. However, most of these methods do not consider the outlier effects. The outliers are the observations with abnormal values, and can affect the damage detection methods by increasing the range of variations of the vibration properties. This decreases the sensitivity of the methods to damage. Therefore, a method is proposed in this paper to eliminate the outlier effects for damage detection. The method uses the row deletion technique to identify the outliers. The row deletion technique analyses the effects of removing an observation from a database, on the model created. The proposed method is applied to a bridge structure in this paper. The results obtained demonstrate that smaller levels of damage can be detected when the outliers are eliminated.