**Damage assessment in beam-like structures by correlation of spectrum using machine learning**

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**Abstract.** Damage assessment in the actual operating process of the structure is a modern and interesting problem of construction engineering due to a number of pragmatic knowledge about the current condition of the inspected structures. However, the faced problem is the difficulty in controlling the excitation in structures. Therefore, the output-based structural damage identification method is becoming attractive because of its potential to be applied to a real application without being constrained by the collection information of excitation source. An approach of damage assessment based on supervised Machine Learning is introduced in this study by using the correlation of spectral signal as a feature (input) of artificial neural network (ANN). An experimental model as the simply supported beam was performed to confirm the reasonableness of the method in engineering structures. Different ANN algorithms have been applied to check the relevance of the proposed feature from vibration data. This study contributes a standard in the problem of damage identification based on spectral correlation.

**Keywords:** Damage identification; Artificial neural network (ANN); Spectral correlation.