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Suppression of Train-Induced Vibrations of Continuous Truss Bridge by Hybrid TMDs

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Steel truss bridges possess the advantages of light weight, high strength, and ease in construction, they therefore are often utilized in railways for crossing streams or chasms. However, because of the existence of clustered frequencies of vibration, there may occur multi resonant peaks in the impact response of continuous truss bridges subjected to high speed trains. To overcome this problem, a hybrid tuned mass damper (TMD) system will be employed to mitigate the train-induced vibrations of the continuous truss bridges. By modeling a continuous truss bridge as a combination of beam and truss elements and the train over it as a sequence of moving loads. The numerical results indicate that the proposed hybrid TMD system can effectively suppress the main resonant peaks of the continuous truss bridge due to the train loads moving at high speeds.

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