Equivalent Circuit Model for the Eddy Current Damping with Frequency-Dependence

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Abstract : This study proposes an equivalent circuit model to simulate the eddy current damping force with shaking table tests and finite element modeling. The model is firstly proposed and applied to a simple eddy current damper, which is modelled in ANSYS, indicating that the proposed model can simulate the eddy current damping force under different types of excitations. Then, a non-contact and friction-free eddy current damper is designed and tested, and the proposed model can reproduce the experimental observations. The excellent agreement between the simulated results and the experimental data validates the accuracy and reliability of the equivalent circuit model. Furthermore, a more complicated model is performed in ANSYS to verify the feasibility of the equivalent circuit model in complex eddy current damper, and the higher-order fractional model and viscous model are adopted for comparison.

Keywords : equivalent circuit model, eddy current damping, finite element model, shake table test

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