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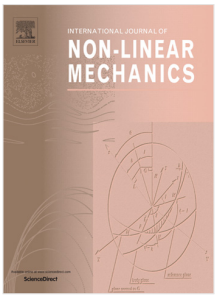

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An impact based mass-in-mass unit as a building block of wideband nonlinear resonating metamaterial

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Abstract

Vibration transmission through a mass-in-mass unit is frequency dependent due to the difference in phase between the internal resonator and the surrounding structure. Generally, the attenuation band is confined between the two-transmission bands for a linear resonating metamaterial. In the case of a linear metamaterial, the attenuation band can be widened up to a certain limit by tunning the material properties, but cannot be extended infinitely by removing the 2nd transmission band. An impacting resonator can attenuate the vibration of the metamaterial due to the counteraction of the external excitation by the resulting impulse force