World Academy of Science, Engineering and Technology
International Journal of Electrical and Computer Engineering
Vol:17, No:05, 2023

Band Gap Tuning Based on Adjustable Stiffness of Local Resonators

Authors : Hossein Alimohammadi, Kristina Vassiljeva, Hassan HosseinNia, Eduard Petlenkov

Abstract : This research article discusses the mechanisms for bandgap tuning of beam-type resonators to achieve broadband vibration suppression through adjustable stiffness. The method involves changing the center of mass of the cantilever-type resonator to achieve piezo-free tuning of stiffness. The study investigates the effect of the center of masses variation (δ) of attached masses on the bandgap and vibration suppression performance of a non-uniform beam-type resonator within a phononic structure. The results suggest that the cantilever-type resonator beam can be used to achieve tunability and real-time control and indicate that varying δ significantly impacts the bandgap and transmittance response. Additionally, the research explores the use of the first and second modes of resonators for tunability and real-time control. These findings examine the feasibility of this approach, demonstrate the potential for improving resonator performance, and provide insights into the design and optimization of metamaterial beams for vibration suppression applications.

Keywords : bandgap, adjustable stiffness, spatial variation, tunability
Conference Title : ICASMS 2023 : International Conference on Acoustic Sensors and Measuring Systems
Conference Location : Paris, France
Conference Dates : May 11-12, 2023