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**Wave attenuation using 2-D composite metamaterial sandwich plates**

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Composite metamaterials are artificial structures designed to achieve performance over static or dynamic conditions that usual materials would not be able to accomplish. In mechanical structures, they can be applied for noise control, vibration isolation, and wave attenuation, for example. Some reliable mathematical models are available to simulate and analyse the behaviour of structures over dynamic conditions, then it is possible to reach and validate accurate results without necessarily performing experiments. Recently, composite sandwich plates combined with the concept of metastructures (with resonators) originated the composite metamaterial sandwich plates. In terms of wave attenuation, the advantage of using composite metamaterial sandwich plates with resonators is the formation of both Bragg-type and locally resonant band gaps. These forbidden bands are regions of frequency where there are only evanescent waves. In addition, the 2-D composite metamaterial sandwich plates have been studied by experimental techniques and numerically. The wave propagation in a 2-D composite metamaterial sandwich plate with periodic arrays of resonators is investigated in this study. This composite metamaterial sandwich plate is capable of filtering the propagation of flexural waves over a specified range of frequency, called band gaps. The band structures are obtained by the finite element (FE) method using COMSOL. First, the case of a composite sandwich plate without periodic resonators is studied. Next, the influence of periodic resonators in the sandwich plates is analysed. The Bragg-type and the locally resonant band gaps are opened up. The results can be used for elastic wave attenuation using 2-D composte metamaterial sandwich structures.