



HOMOGENISATION AND DYNAMICS OF RANDOMLY IRREGULAR METAMATERIAL

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ABSTRACT

Metamaterials based on hexagonal periodic cells (honeycombs) have gained considerable attention in recent years. This can be an advanced material due to its capability of meeting high performance requirements in various critically desirable application-specific parameters [1]. These structural assemblies not only make an efficient use of material, but are also characterized by interesting dynamic and wave propagation properties. A semi-analytical formulation has been developed for wave propagation in irregular honeycombs. Spatial structural irregularity of hexagonal lattices has been considered. There are few scientific literatures available concerning analysis of wave propagation in regular honeycombs [2]. However, due to inevitable uncertainties associated with manufacturing and service conditions, honeycomb lattices may not be always perfectly regular. The effect of spatially random structural irregularity in wave velocities of such irregular honeycombs will be discussed. The nature of so called 'pass band' and 'stop bands' due to irregularities will be explained.

REFERENCES

- [1] Gibson L., Ashby M. F. (1999) Cellular Solids Structure and Properties. Cambridge University Press, Cambridge, UK.
 - [2] Gonella S., Ruzzene M. (2008) Analysis of in-plane wave propagation in hexagonal and re-entrant lattices, Journal of Sound and Vibration 312 125–139
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