Effective speed of sound in phononic crystals

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A new formula for the effective quasistatic speed of sound c in 2D and 3D periodic materials is reported. The approach uses a monodromy-matrix operator to enable direct integration in one of the coordinates and exponentially fast convergence in others. As a result, the solution for c has a more closed form than previous formulas. It significantly improves the efficiency and accuracy of evaluating c for high-contrast composites as demonstrated by a 2D example with extreme behavior.

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