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Three-dimensional exact solution for vibration analysis of thick functionally graded porous (FGP) rectangular plates with arbitrary boundary conditions

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ABSTRACT:

In this paper, a novel three-dimensional exact solution is performed for vibration analysis of thick functionally graded porous rectangular plates subject to arbitrary boundary conditions. The theoretical model is based on the three-dimensional elastic theory. Three kinds of porosity distributions including even, uneven and the logarithmic-uneven are performed. Non consideration boundary conditions, all displacements of the rectangular plate are unified expanded as a improve Fourier series, which consists of standard three-dimensional (3-D) Fourier cosine series supplemented with closed-form auxiliary functions introduced to eliminate all the relevant discontinuities with the displacements and its derivatives at the edges. As the displacement field is sufficiently smooth in the entire solution domain, the exact solution of the energy function of the plate is obtained through the Rayleigh Ritz process. The numerical examples are given to verify the

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