BOUNDARY ELEMENT SOLUTION OF 2D COUPLED PROBLEM IN ANISOTROPIC PIEZOELECTRIC FGM PLATES

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ABSTRACT

The mechanics of the piezoelectric functionally graded material (FGM) has received considerable research effort with their increasing usage in various applications including sensors and actuators, piezoelectric motors, reduction of vibrations and noise, infertility treatment and photovoltaics. It is hard to find the analytical solution of a problem in a general case, therefore, an important number of engineering and mathematical papers devoted to the numerical solution have studied the overall behavior of such materials. The boundary element method (BEM) has become an alternative technique to domain discretization techniques such as finite difference method (FDM) and finite element method (FEM) for solving problems of piezoelectric FGM plates. Presence of domain integrals in the formulation of the BEM dramatically decreases the efficiency of this technique. One of the most frequently used techniques for converting the domain integral into a boundary one developed through our paper is the so-called dual reciprocity boundary element method (DRBEM).

The time-stepping dual reciprocity boundary element method was proposed to solve the 2D coupled problem in anisotropic piezoelectric FGM plates. The accuracy of the proposed method was examined and confirmed by comparing the obtained results with those known previously.

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