عنوان مقاله:

On the Buckling the Behavior of a Multiphase Smart Plate based on a Higher-order Theory

محل انتشار:

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خلاصه مقاله:

Magneto-electro-elastic materials are multiphase smart materials that exhibit coupling among electrical, magnetic and mechanical energy fields. Due to this ability, they have been the topic of numerous research in the past decade. In this paper, buckling behavior of a multiphase magneto-electro-elastic rectangular plate with simply supported boundary conditions is investigated, based on Reddy's higher-order shear deformation theory. Gauss's laws for electrostatics and magnetostatics are used to model the electric and magnetic behaviors of the plate. The partial differential equations of motion are reduced to ordinary differential equations by using the Galerkin method. Then, the closed-form expression for the critical buckling load of the plate considered is obtained. Some examples are presented to validate the study and to investigate the effects of some parameters on the critical buckling loads of the multiphase magneto-electro-elastic rectangular plates. It is found that the buckling behavior of the magneto-electro-elastic plate is dominated by the elastic properties of the plate, and magneto-electric coefficients slightly increase the critical buckling load of the plate.

کلمات کلیدی:

Analytical Solution, Buckling load, Higher-order plate theory, Magneto-electro-elastic coupling, Smart plate

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