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Porosity influence on structural behaviour of skew functionally graded magneto-electro-elastic plate

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Abstract: This article presents a finite element (FE) formulation to assess the influence of porosity on the static responses and free vibration of functionally graded skew magneto-electro-elastic (FGSMEE) plate. The porosity is accounted for local density using modified power law. The skew edges of the plate are achieved by implementing transformation matrix. The coupled constitutive relations establish the different couplings associated with MEE materials. The displacements, potentials, and stresses for the porous skew plate are established through static analysis. The influence of porosity on the natural frequency of the skew plate is investigated via free vibration analysis. The influence of different porosity distributions on various skew angles of the FGSMEE plate has been studied. The effect of porosity volume, skew angle, and geometrical parameters such as aspect ratio, thickness ratio, and boundary conditions on the porous FGSMEE plate is investigated.

Keywords: porosity; functionally graded; free vibration; magneto-electro-elastic; skew plate; static analysis.

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