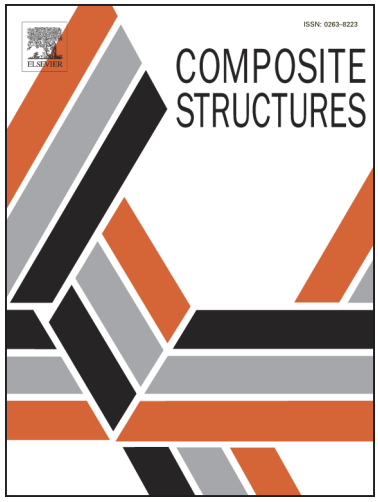

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A finite element formulation for large deflection of multilayered magneto-electro-elastic plates

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Abstract

An original finite element formulation for the analysis of large deflections in magneto-electro-elastic multilayered plates is presented. The formulation is based on an equivalent single-layer model in which first order shear deformation theory with von Karman strains and quasi-static behavior for the electric and magnetic fields are assumed. To obtain the plate model, the electro-magnetic state is firstly determined and condensed to the the mechanical primary variables, namely the generalized displacements. In turn, this result is used to obtain laminate effective stiffness coefficients that allow to express the plate mechanical stress resultants in terms of the generalized displacements and applied electro-magnetic boundary conditions only, taking the magneto-electro-elastic couplings into account. The weak form of the mechanical equilibrium equations is then written and used to express the finite element matrices. Numerical results obtained by implementing an

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