

Size-dependent nonlinear vibrations of micro-plates subjected to in-plane magnetic field

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Abstract: Nonlinear vibrations of the microplates subjected to the influence of a longitudinal magnetic field are considered. Size-dependent model based on a modified couple stress theory is employed. The governing equations for geometrically nonlinear vibrations use the von Karman plate theory. Effect of the magnetic field is taken into account due to the Lorentz force deriving from the Maxwell's equations. Developed approach is based on applying of the Bubnov-Galerkin method and reducing partial differential equations to an ordinary differential equation. Some calculations are performed to validate the proposed algorithm in comparison with the known from literature results. Influence of the magnetic field, material length scale-parameter, plate aspect ratio on the system behavior is studied.

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