



Application of R-functions theory to investigation of geometrically nonlinear vibrations of laminated shallow shells with layers of variable thickness

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Abstract: In this work we are aimed on the development of a novel method suitable for analysis of geometrically nonlinear vibrations of the shallow shells with complex plan form and layers of the variable thickness. This method is based on combined application of the R-functions theory, variation Ritz's method, as well a hybrid Bubnov-Galerkin and Runge-Kutta's method. Formulation of the problem is within the framework of two approaches, i.e. the classical and first order shear deformation shells theories. Due to original scheme of discretization regarding time the initial problem is reduced to that of solution of a sequence of linear problems including those related to linear vibrations, special type of elasticity, and non-linear system of ordinary differential equations in time. Both investigation of test problems for shallow shells with rectangular plan form and new vibration problems for shallow shells with complex plan forms are illustrated and discussed.

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