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Nonlinear dynamics of flexible mesh cylindrical panels in the white noise's field

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Abstract: The mathematical model of the nonlinear dynamics of flexible mesh cylindrical panels in the additive white noise's field is constructed in this paper. To account for size-dependent behavior, a nonclassical continual model based on a Cosserat medium is considered. Thus, along with the classical stress field, the moment voltages are also taken into account. It is also assumed that the fields of displacements and rotations are not independent. The equilibrium equations for the plate element and the boundary conditions are obtained from the Ostrogradskyi-Gamilton variation principle on the basis of Kirchhoff-Lov's kinematic hypothesesand Karman's geometric nonlinearity.In accordance with a continual model, a mesh panel consisting of a regular system of often located same material's edges is replaced by an equivalent continuous layer having some averaged stiffness depending on the layout of the edges and their stiffness.The system of differential equations in partial derivatives is reduced to a system of ODE using the finite difference method of the second order of accuracy. The resulting system is solved by the fourth-order Runge-Kutta methods. The work was supported by the RFBR, № 18-01-00351a

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