MECHANICS

UDC 539.3

ON THE VIBRATIONS OF FUNCTIONALLY GRADED POROELASTIC COLUMNS

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Using numerical methods for solving systems of differential equations with variable coefficients the problem for steady-state vibrations of poroelastic functionally-gradient column is studied. For two numerical methods: shooting method and Galerkin kind method the corresponding accuracy is shown. Using linearization approach for base system of differential equations the corresponding integral equations for solving inverse problem for reconstruction of permeability coefficient are formulated. The group of numerical experiments for reconstruction of unknown parameters are realized.

Keywords: *poroelasticity, inverse problems, numerical methods.*

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CONTACT PROBLEM FOR AN INHOMOGENEOUS ELASTIC HALF-SPACE

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The three-dimensional contact problem with an unknown contact zone is investigated for an inhomogeneous elastic half-space when shear modulus is constant while Poisson's ratio depends on depth. An extra normal force is applied outside contact area. With the help of a Fourier transformation the problem is at first reduced to a two-dimensional integral equation of the first kind. Then for solving the problem the Galanov's method of Hammerstein type nonlinear boundary integral equations is used, which allows us to determine the contact domain as well as the contact pressure simultaneously. The contact pressure and the impressed force are calculated for a pyramidal punch for trigonometric distributions of Poisson's ratio.

Keywords: *contact problem, inhomogeneous half-space, Poisson's ratio.*

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