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The problem of longitudinal elastic waves propagation is considered for a rod with periodically alternated materials separated by attached masses. In the framework of the Floquet theory relation is obtained between wave frequency and Floquet wave number. The result demonstrates that in homogeneous rod the existence of Floquet waves caused by periodically system of attached masses are possible.

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Resistivity to concrete shrinkage of various zones of masses cross-section

To the investigation of regularities of resistivity to concrete shrinkage change along the cross-section of massive elements not numerous papers are devoted. In these investigations, however, the influence of the aging factor on the denoted regularity was not taken into account. The present paper deals with the study of resistivity to concrete shrinkage in the various zones of the section of the masses, taking into account the age of the material.

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Stabilization possibility of existing extensions from overturning and collision with a basic building at seismic action

A lot of buildings with extensions exist in the city of Yerevan, where the majority of extensions are located near to the stone buildings that demand increasing the level of seismic resistance or strengthening. Chaotic and structurally not correctly built extensions at seismic action represent serious danger so far as dynamic loadings can overturn or destruct of an extension at possible collision with the basic building at its oscillation. The basic imperfection and defects of existing extensions, and also possible approaches and the strengthening methods are shown in article, where these methods can provide bearing ability and several times to reduce both overturning possibility, and collisions of an extension with the basic building at seismic action.

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The Study of Mechanical Properties of Rocks by Using the True Triaxial Loading Setup

The paper is devoted to experimental study of deformation, strength and filtration properties of rocks forming reservoirs of oil and gas fields. The investigations were carried out by using a unique experimental True Triaxial Loading Setup developed at the Institute for Problems in Mechanics of RAS. The techniques of elastic and strength constant determining for anisotropic rocks are developed. Dependence of filtration characteristic of rock on stress-strain state is studied. The results which are of great practical importance in terms of developing methods of enhanced oil recovery and methods of ensuring stability of directional wells are presented.

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Some results of stability and post-critical behavior of a circular membrane with a complex meridian profile

Brief description of the numerical-analytic algorithm for the analysis of equilibrium and stability of circular membrane with an arbitrary profile of the meridian and some results of numerical analysis of stability and post-critical behavior of a spherical dome with possible deviations from the ideal surface are presented.

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The load transmission from the heterogeneous stringer to elastic half-plane or infinite plate in the presence of the shear
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On the optimal stabilization of the transient linear nonhomogeneous systems
In the research of the problem of optimal stabilization of a driven simple pendulum linear nonhomogeneous systems have been obtained, the study of which has a theoretical and applied importance. The problem of optimal stabilization of linear nonhomogeneous systems with constant coefficients has been solved in. In this paper the optimal stabilization problem of linear nonhomogeneous systems with variable coefficients has been considered. It was assumed that coefficients of the phase coordinates were continuous and bounded functions and the nonhomogeneous part of the system was continuous function, which tended to zero at infinity ($t \rightarrow \infty$). The problem has been solved by using Lyapunov-Bellman method. An optimal Lyapunov function has been obtained, the convergence of originated improper integrals have been shown, and optimal control actions have been constructed. For example, a problem of optimal stabilization of the equilibrium position of a simple pendulum has been investigated, when the suspension center could move in any direction in the plane of the oscillations of pendulum.
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On the stability of orthotropic cylindrical shell of linear-variable thickness taking into account the transversal shear displacement
In the framework of refined theory the linear problem of static stability of orthotropic cylindrical shell of linear-variable thickness is solved. The question of optimum is considered. It is shown that among the all linear-variable thickness shells of the similar volume under the hinged support of both edges the largest critical value of compression forces has the shell of constant thickness.
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Modeling of the plastic deformation localization, strain softening and continuum fracture under dynamical shock loading
 The strain localization problems in softening solids under dynamic loading are considered. Two different models are accepted. One is elastoviscoplastic model with a strain softening diagram and another is the second order gradient elastoplastic model. By the asymptotic method of matching rapidly and slowly changing solutions for the partially differential equations with a small parameter, developed by the author, the close form solution for a one-dimensional dynamic localization problem was obtained for the both models. A bar loaded instantaneously by forcing both ends to move with a constant opposite velocity of the magnitude V_0 is considered. After the collision of generated elastic waves at the middle point of a bar the plastic strain is appeared. The plastic strains $\varepsilon < \varepsilon^*$ propagate along a bar and the strains $\varepsilon > \varepsilon^*$ concentrate at the middle point of the bar, ε^* is the strain related to the maximum stress. The zone of these large strains forms a band of strain localization with the width slowly growing in time. The solution describing the structure of the bands is obtained in an analytical form for both models. The profile of the elastoviscoplastic solution is monotone, while for the second gradient theory it is oscillating, but the effective width of the band for the both models is similar and is growing in time as $t^{1/2}$. Note, that the linear analysis predicts constant width of a localization band and the solution obtained for strain rate-insensitive elastoplastic material shows that localization takes place only at one point. It is shown that the exact solution obtained in the framework of the Prandtl-Reiss physically incorrect and leads to inconsistent results.
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