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S. Toraighyrov Pavlodar State University

N. A. Ispulov

PATTERNS OF THE PROPAGATION OF THERMOELASTIC WAVES IN ANISOTROPIC MEDIA

Monograph

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Based on the matrix method, the monograph considers the problems of the thermoelastic wave propagation in anisotropic media of various symmetry classes.

The paper is of interest for students, candidates for a master's degree and a doctor's degree with a major in "Physics", "Mechanics" as well as for the geophysics and seismology research institutes in solving the problems related to the study of wave actions in anisotropic thermoelastic media.

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Introduction

The monograph deals with theoretical issues of the regularities of the thermoelastic wave propagation in anisotropic media of all syngonies.

Based on the analytical matrix method, the paper covers thermoelastic wave propagation in anisotropic media. Based on the closed thermoelasticity equation system, the first order differential equation systems with variable coefficients were obtained. The coefficient matrices for anisotropic media of cubic, hexagonal, tetragonal, orthorhombic, monoclinic, and triclinic syngonies in volumetric, plane and one–dimensional cases were obtained. According to the structure of the coefficient matrices, the relationship of waves of different polarization was brought to light. The structure of the fundamental solutions of the system of the first–order differential equations, which describe the thermoelastic wave propagation in the anisotropic media listed above, was constructed. Equations of the elastic and thermoelastic wave dispersion for unbounded periodic structures were obtained.

The types of the dependence of the rates and attenuation coefficients, coupled thermoelastic waves on frequency were determined. The qualitative graphic dependences of rates and attenuation coefficients of the elastic and thermal waves on frequency, when the medium parameters change, were constructed. For the case of 4^{th} order coefficient matrices, the problems associated with the wave reflection–refraction on the border of homogeneous anisotropic thermoelastic media were solved.

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