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**STEADY OSCILLATION PROBLEMS IN THE LINEAR  
THEORY OF THERMOELASTICITY OF BINARY  
MIXTURES**

The mathematical models of the mixtures of elastic solids are presented by Green A. E., Naghdi P. M., Steel T. R., Lempriere B. M., McNiven H. D., Tiersten H. F., Bowen R. M., Bedford A., Rushchitsky Y.

In this paper the boundary value problems of the binary mixtures of the elastic solids are investigated by means of the boundary integral method (BIM).

The fundamental solutions of the systems of the equations of static and steady oscillations for mathematical models of the binary mixtures of elastic solids are constructed in terms of elementary functions.

The uniqueness and existence theorems of interior and exterior boundary value problems of static and steady oscillations by means of BIM and multidimensional singular integral equations are proved. The Sommerfeld–Kupradze type radiation conditions are established.

The existence of eigenfrequencies of the interior homogeneous boundary value problems of steady oscillations is studied. The formulae of asymptotic distribution of eigenfrequencies and eigenfunctions are obtained.

The basic properties of plane waves are treated and existence theorems of eigenfrequencies of the interior homogeneous boundary value problems of steady oscillations are proved. The following connection between plane waves and eigenfrequencies is established.

**Theorem 1.** *If all plane waves propagating through a binary mixtures of elastic solids are damped, then the interior homogeneous steady oscillation problems have only the trivial solution, that is exist no oscillation eigenfrequency.*

**Theorem 2.** *If through a binary mixtures of elastic solids there propagates at least one plane wave with constant amplitude, then the existence of eigenfrequencies is possible in the interior homogeneous steady oscillation problems.*