

SPEAKER:

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TITLE:

Boundary integral equations of coupled thermoelastodynamics

ABSTRACT:

Studying of dynamic processes in the various environments (f.e. rocks) connected with emergence, transmission and diffraction of the waves arising under the influence of various external and internal sources of a natural or artificial origin, is among the actual scientific and technical problems. In mechanical engineering, for example, at creation of various constructions, made of materials, possessing various mechanical properties, which in use are exposed to various dynamic and thermal shock loadings, development of new effective methods is necessary for research of their intensive and deformed condition for definition of strength characteristics. In problems of geophysics and seismology research of processes of diffraction and refraction of seismic waves on boundaries of environments is closely connected with questions of seismic division into districts of territories, antiseismic construction of buildings and underground. More effective and economic methods for studying of wave processes in environments are the methods of mathematical simulation. Their using is connected with creation of mathematical models. Creation on the basis of these models varies software allows to make numerical experiments on studying of intensive and deformed condition of environments at various dynamic influences which often can't be carried out on real objects experimentally. The purpose of the research is to construct the method of the boundary integral equations (BIEM) for solving a transient value problem of coupled thermoelastodynamics. The following problems have been solved: (i) the influence of the temperature on the character of distribution of thermoelastic waves was investigated; (ii) The thermoelastic statement of media in two- and three-dimensional cases was considered under by action of the non-stationary concentrated mass forces and thermal sources; (iii) Two types of Tensors of fundamental stresses were constructed, their properties were investigated, and their asymptotics were constructed; (iv) the dynamical analogue of Formula of Gauss. The BIEM for the thermostresses condition of media was developed at the given non-stationary loadings and thermal flow on its border in bounds in two- and three-dimensional cases.