Mixed boundary-transmission problems for composite layered elastic structures

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Abstract

We investigate mixed type boundary-transmission problems of the generalized thermo-electro-magneto elasticity (GTEME) theory for complex elastic anisotropic layered structures containing interfacial cracks. This type of problems are described mathematically by systems of partial differential equations with appropriate transmission and boundary conditions for six dimensional unknown physical field (three components of the displacement vector, electric potential function, magnetic potential function, and temperature distribution function). We apply the potential method and the theory of pseudodifferential equations and prove uniqueness and existence theorems of solutions to different type mixed boundary-transmission problems in appropriate Sobolev spaces. We analyze smoothness properties of solutions near the edges of interfacial cracks and near the curves where different type boundary conditions collide.

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