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THE BASIC AND MIXED BOUNDARY VALUE PROBLEMS OF ELASTIC MIXTURES THEORY FOR INFINITE PLANE WITH CUTS

Suppose we have an infinite plane with curve cuts $S_1, S_2, \ldots, S_n$. Let $S_J = p_j q_j$, $j = 1, 2, \ldots, n$ be simple nonintersecting sufficiently smooth curves with positive direction from p_j to q_j. The infinite plane with cuts is denoted by D.

The following boundary value problems (BVP) are investigated for the homogeneous system of equations of elastostatics of the theory of mixtures.

Find a regular solution of the system in the domain D satisfying the one of the following boundary conditions:

 (i) the displacement vector is given on both sides of the cuts (the first basic BVP);
 (ii) the stress vector is given on both sides of the cuts (the second basic BVP);
 (iii) the displacement vector is given on one side of the cuts and the stress vector is prescribed on the other side of cuts (the mixed BVP).

Applying the general representation formula of solution by means of complex valued potentials, the existence and uniqueness theorems are proved.