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Inverse Problems of Thermoelasticity for Frictionally Interacting Layers

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For friction contact of two different layers, the following new inverse problems have been formulated and analyzed. Problem 1 consists in determining unknown thermal loading on one of the outer boundary surfaces of the friction couple using additionally given vertical displacements of the other surface. In problem 2, under prescribed boundary and initial conditions using additionally given vertical displacements of the outer boundary surface, intensity of frictional heat flux (friction coefficient) is determined. The solving of these problems is reduced to the Volterra integral equations of the first kind. The stable solution of the integral equation corresponding to problem 1 is constructed using the Laplace transformation, while that corresponding to problem 2 is solved by the method of averaged functional corrections. Based on the solution of the direct contact thermoelasticity problem for the friction couple bronze-steel, numerical verification of the method of solving the formulated problems has been performed.

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