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BOUNDARY INTEGRAL EQUATIONS IN BENDING OF THERMOELASTIC PLATES WITH MIXED BOUNDARY CONDITIONS

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This article is dedicated to Professor Zuhair Nashed,
a good friend and colleague,
for his long and distinguished service to the mathematical profession.

ABSTRACT. Initial-boundary value problems for bending of a thermoelastic plate with transverse shear deformation are studied under the assumption that different parts of the boundary are subjected to different types of physical conditions. The solutions of these problems are represented as single-layer and double-layer thermoelastic potentials, which leads to time-dependent systems of boundary integral equations. The unique solvability of these systems is proved in spaces of distributions.

1. Introduction. Mathematical models of elastic plates aim to replace the study of full three-dimensional problems with that of simpler theories in only two dimensions, concentrating the computation on the phenomenon of bending and disregarding other, less significant, effects. Kirchhoff's classical theory reduces to the solution of a fourth-order equation with two boundary conditions. Later models (see, for example, [1]) yield more information by including the action of transverse shear forces into a system of three second-order equations accompanied by three boundary conditions. The model considered in [1] was later extended to bending motions and, more recently, to thermoelastic plates,

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