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**PARTIALLY UNKNOWN BOUNDARY PROBLEMS OF PLANE THEORY OF
ELASTICITY AND OF BENDING OF THIN PLATES**

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The problem of bending of thin plate is investigated. Let a midsurface of an elastic plate occupy a domain which is presented as a quadrate weakened by one unknown full-strength hole whose symmetric axes are quadrate diagonals and the lines paralleling to the quadrate sides and passing through the quadrate diagonals intersection point. In addition the quadrate vertices are cut by equal unknown full-strength arcs.

Let us assume that rigid rods are attached to the linear parts of outer boundary of plate. The plate suffers deflection by the action of bending moment applied to the middle point of rods. The unknown parts of boundary are free from the outer action. These unknown parts of boundary and stress state of plate are determined by the method of analytical function theory. The unknown parts of boundary are constructed.

The axially symmetric problem of the plane theory of elasticity with partially unknown boundary for equilateral trapezium weakened by one hole which is symmetric with respect to its axes symmetry is investigated. The tangential stresses and the normal displacements are zero along the entire boundary of the equilateral trapezium. The uniformly distributed normal stress is applied to the hole boundary. The shape of the contour of the required hole and the stressed state of the given body are determined, provided that the tangential normal stress σ_s arising at contour of required hole would take the constant value. Equistable contours of holes are found by means of complex analysis. The considered problems with partially unknown boundaries are reduced to the known boundary value problems of the theory of analytic functions by means of the developed method. The solutions are presented in quadratures. Equistable contours are constructed.