The problem of plane elasticity theory with partially unknown boundary

Nana Odishelidze
email: nana.odishelidze@tsu.ge
Interdisciplinary Department (Mathematics, Computer Sciences)
Faculty of Exact and Natural Sciences
Iv.Javakhishvili Tbilisi State University
13, University st., 0143, Tbilisi
GEORGIA

Annotation

The paper addresses to problem of plane elasticity theory with partially unknown boundary for plate weakened with a hole. Tangential normal stresses and tangential normal moments whose values depend on external loads and hole shapes play an important role in the plasticity zone formation in the plates with the holes and also in the plate destruction in the neighborhood to the plate's hole boundary

The solvability of this problem provides the controlling of stress optimal distribution with selecting the appropriate hole boundary.

Using the methods of complex analysis [1], a stressed state of the body are defined. On the basis of developed method, the considered problem with partially unknown boundary reduced to the known boundary value problem of analytical function theory. The numerical analysis is presented and the corresponding plots are constructed.

References

1.Muskhelishvili, N.: Some Basic Problems of the Mathematical Theory of Elasticity. Fundamental Equations, Plane Theory of Elasticity, Torsion and Bending, XXXI. Noordhoff International Publishing, Leyden, (1975).