Stress concentration in an elastic plate with a full-strength hole

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Annotation

The problem of stress concentration for a square shape elastic plate weakened with a full-strength hole is considered. Its neighborhoods are cut by the same smooth full-strength arcs which are symmetric with respect to the coordinate axes. Rigid bars are attached to each component of the broken line of the outer boundary of the plate. The plate bends under the action of concentrated moments applied to the middle points of the bars. The unknown part of the boundary is free from external forces. Using the methods of complex analysis [1], the unknown part of the boundary is found under the condition that the tangential–normal moment takes a constant value. Numerical analysis is performed and the corresponding graphs 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).