

Modeling and solving the two-dimensional non-stationary problem in an elastic body with a rectangular hole

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Abstract: In this work we consider the problem of the propagation of non stationary stress waves in an elastic body with a rectangular hole in the linear formulation. The wave process is caused by applying an external dynamic load on the front boundary of the rectangular region and the lateral boundaries are free of the stress. The lower boundary of the rectangular region is rigidly fixed, and the contour of the rectangular hole is free from the stress. The problem is solved by using the difference method of the spatial characteristics. On the basis of the developed numerical methods it is obtained the computational finite - difference relations of the dynamic problems at the corner points of the rectangular hole, where the first and second derivatives of the unknown functions have a discontinuity of the first kind. We analyze the dynamic stress fields in an elastic body with a rectangular hole and we studied the concentration of dynamic stresses in the vicinity of the corner points of the rectangular opening.[1-8]

Keywords: speed, stress, load, plane strain, stress concentration, numerical solution, wave propagation

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