

Gomonova, O. V.; Senashov, S. I.

Determining elastic and plastic deformation regions in a problem of uniaxial tension of a plate weakened by holes. (English. Russian original) [Zbl 1459.74025](#)

J. Appl. Mech. Tech. Phys. 62, No. 1, 157-163 (2021); translation from *Prikl. Mekh. Tekh. Fiz.* 62, No. 1, 179-186 (2021).

Summary: This paper describes a solution to the problem of determining the elastic and plastic deformation regions arising in a plate that is under tension and weakened by two circular holes in the case of a plane stress state. A method for solving the problem is based on the use of conservation laws.

MSC:

- [74C05](#) Small-strain, rate-independent theories of plasticity (including rigid-plastic and elasto-plastic materials)
- [74K20](#) Plates
- [74G10](#) Analytic approximation of solutions (perturbation methods, asymptotic methods, series, etc.) of equilibrium problems in solid mechanics

Cited in **2** Documents

Keywords:

elastoplastic problem; conservation laws; plane stress state; uniaxial tension

Full Text: [DOI](#)

References:

- [1] B. D. Annin and G. P. Cherepanov, *Elastoplastic Problem* (Nauka, Novosibirsk, 1983) [in Russian].
- [2] N. P. Ostrosablin, "Plastic Zone Around a Round Hole in a Plane with a Nonuniform Basic Stressed State," *Prikl. Mekh. Tekh. Fiz.* 31 (5), 124-131 (1990) [*J. Appl. Mech. Tech. Phys.* 31 (5), 783-792 (1990)].
- [3] V. M. Mirsalimov, "Elastoplastic Tension Problem for a Plate with a Circular Hole with Account for Crack Nucleation in an Elastic Deformation Region," *Prikl. Mekh. Tekh. Fiz.* 61 (4), 162-173 (2020) [*J. Appl. Mech. Tech. Phys.* 61 (4), 641-651 (2020)]. · [Zbl 1451.74151](#)
- [4] B. D. Annin, "Elastoplastic Stress Distribution in a Plane with a Hole," *Dokl. Akad. Nauk SSSR* 184 (2), 315-317 (1969).
- [5] N. I. Ostrosablin, *Plane Elastic-Plastic Stress Distribution Around Circular Holes* (Nauka, Novosibirsk, 1984) [in Russian].
- [6] *Symmetries and the Conservation Laws of Equations of Mathematical Physics*, Ed. by A. M. Vinogradov and I. S. Krasil'shchik (Faktorial Press, Moscow, 2005) [in Russian].
- [7] P. P. Kiryakov, S. I. Senashov, and A. N. Yakhno, *Using Symmetries and Conservation Laws to Solve Differential Equations* (Izd. Sib. Otd. Ross. Akad. Nauk, Novosibirsk, 2001) [in Russian].
- [8] S. I. Senashov, O. V. Gomonova, and A. N. Yakhno, *Mathematical Questions of Two-Dimensional Equations of Perfect Plasticity* (Reshetnev Siberian State Univ. of Sci. and Technol., Krasnoyarsk, 2012) [in Russian].
- [9] S. I. Senashov, O. N. Cherepanova, and A. V. Kondrin, "On Elastoplastic Torsion of a Rod with Multiply Connected Cross-Section," *J. Sib. Federal Univ. Math. Phys.* 7(1), 343-351 (2015). · [Zbl 07325235](#)
- [10] S. I. Senashov and O. V. Gomonova, "Construction of Elastoplastic Boundary in Problem of Tension of a Plate Weakened by Holes," *Int. J. Nonlinear Mech.* 108, 7-10 (2019).
- [11] L. V. Ovsiannikov, *Group Analysis of Differential Equations* (Nauka, Moscow, 1978; Academic Press, 1982). · [Zbl 0485.58002](#)

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.