Exact solution of exterior boundary value problems of elasticity in parabolic coordinate system

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In the present work the boundary value problems of elasticity are considered in system of parabolic coordinates ξ, η $(-\infty < \xi < \infty,\ \ 0 \leq \eta < \infty$, if x, y are Cartesian coordinates, then $x = \frac{c}{2}(\xi^2 - \eta^2)$, $y = c\xi\eta$, where c is a scale coefficient and in our case we take $c = 1)$ [1]. In the parabolic coordinates are written the equilibrium equations system and Hooke's law [2]. Analytical (exact) solutions of 2D problems of elasticity are constructed in the domain bounded by coordinate lines of the parabolic coordinate system. Exact solutions are obtained using the method of separation of variables. Here we represent external boundary value problem of elastic equilibrium of the homogeneous isotropic infinite body bounded by parabola, when on parabolic border normal stress is given. Numerical results and corresponding graphs of above-mentioned problem are presented.

References

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