

## Shock Torsion Wave in an Elastic Rod with Decreasing Function of Viscoplastic External Friction

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**Abstract:** The wave problem of propagation and deceleration of shock torsion perturbation in semi-infinite round elastic rod interacting with the medium is investigated using the model of viscoplastic friction with decreasing relation between shear stress and jump of velocity on the lateral surface. After linearization, an exact solution of the initial-boundary problem describing the effect of “negative viscosity” is obtained using the Laplace transforms. A wave pattern of perturbation including the prefront zone of rest, the area of motion and the domain of stationary residual stresses has been built. The three-dimensional diagrams for nonstationary fields of velocity and stresses have been constructed too.

**Keywords:** elastic rod, torsion wave, viscoplastic friction, negative viscosity