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Cessation of flows of a viscoplastic medium in channels. (English. Russian original)

Zbl 1337.76001

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From the introduction: An important qualitative feature of the problems on the time-dependent motion of viscous-plastic media is the finiteness of the damping time of the motion in the absence of external forces. This is a distinction of kind from the corresponding flow of the viscous liquid, which damps exponentially for an infinitely long time. One of the most important problems of interest from both the theoretical and practical viewpoints is the flow in a channel. In this work, we carried out mathematical modeling of the cessation process for different transverse sections and investigated the evolution of rigid zones and the dependence of the stopping time on the internal parameters of the medium and cross-section geometry. We found a previously unknown qualitative feature, namely, the appearance of stagnant zones in the course of stopping, which completely or partially surround the boundary contour depending on the shape of the channel section.

MSC:

76A05 Non-Newtonian fluids

74C10 Small-strain, rate-dependent theories of plasticity (including theories of viscoplasticity)

76D99 Incompressible viscous fluids

76M25 Other numerical methods (fluid mechanics) (MSC2010)

Full Text: [DOI](#)

References:

- [1] P. P. Mosolov and V. P. Myasnikov, \textit{Variational Methods in the Flow Theory of the Rigid-Viscous-Plastic Media} (Mosk. Gos. Univ., Moscow, 1971) [in Russian].
- [2] A. A. Il'yushin, Uch. Zap. MGU, Mekhanika, No. 39, 3 (1940).
- [3] D. M. Klimov, A. G. Petrov, and D. V. Georgievskii, \textit{Viscous-Plastic Flows. Dynamic Chaos, Stability, Mixing} (Nauka, Moscow, 2005) [in Russian].
- [4] Dean, E. J.; Glowinski, R.; Guidoboni, G., No article title, J. Non-Newtonian Fluid Mech., 142, 36, (2007) · [Zbl 1107.76061](#)
- [5] Muravlyova, E. A., No article title, Mat. Model., 409, 76, (2008)
- [6] Chatzimina, M.; Georgiou, G.; Argyropaidas, I.; etal., No article title, J. Non-Newtonian Fluid Mech., 129, 117, (2005) · [Zbl 1195.76012](#)
- [7] Chatzimina, M.; Xenophonyos, C.; Georgiou, G.; etal., No article title, J. Non-Newtonian Fluid Mech., 142, 135, (2007) · [Zbl 1113.76014](#)

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