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Weakly Nonhomogeneous Viscous and Viscoplastic Flows: Stability and Mixing

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A stability and beginning of mixing in weakly nonhomogeneous viscous and viscoplastic (Bingham) media with respect to low perturbations are investigated. Both the main flow and imposed perturbations are supposed to be three-dimensional. The sufficient estimates based on variational inequalities in various functional spaces (the energetic estimates) are derived to analyse an increase or decay of initial perturbations. A choice of the functional space determines the measures for parameters deviation. Moreover, these measures may differ for the initial parameters and current ones. An arbitrarily general insteady motion of a homogeneous incompressible viscous or viscoplastic medium in 3D domain of the Eulerian space is taken in the capasity of the non-perturbed process. It is shown that an increase or decay of kinematic perturbations linearly depend on the initial variations of density and viscosity. An unlimited growth of these variations is interpreted as mixing beginning on macrolevel.

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