

Non-Newtonian fluids with discontinuous-in-time stress tensor

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Abstract

We consider the system of equations describing the flow of incompressible fluids in bounded domain. In the considered setting, the Cauchy stress tensor is a monotone mapping and has asymptotically $(s - 1)$ -growth with the parameter s depending on the spatial and time variable. We do not assume any smoothness of s with respect to time variable and assume the log-Hölder continuity with respect to spatial variable. Such a setting is a natural choice if the material properties are instantaneous, e.g. changed by the switched electric field. We establish the long time and the large data existence of weak solution provided that $s \geq \frac{3d+2}{d+2}$.