Steady flow of non-Newtonian fluids – monotonicity methods in generalized Orlicz spaces

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Abstract

Our purpose is to show existence of weak solutions to steady flow of non-Newtonian incompressible fluids with nonstandard growth conditions of the Cauchy stress tensor. We are motivated by the fluids of strongly inhomogeneous behavior and characterized by rapid shear thickening. Since $L^p$ framework is not sufficient to capture the described model, we describe the growth conditions with help of general $x$-dependent convex function and formulate our problem in generalized Orlicz spaces. We will use the generalization of classical Minty-Browder method to nonreflexive spaces.

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