Motion of rigid bodies in a non-Newtonian fluid with nonstandard rheology

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Abstract

We prove the existence of weak solutions to the problem of motion of one or several nonhomogenous rigid bodies immersed in homogenous non-Newtonian fluid which occupies bounded domain. In particular we want to investigate the case of shear-thickening fluids of rheology more general then power-law. Therefore nonlinear viscous term in the system of equations is described with help of a general convex function defining Orlicz spaces. The main ingredient of the proof is to show the convergence in a nonlinear term. We achieve the result with help of a monotonicity methods for nonreflexive spaces and a pressure localisation method. Therefore we provide decomposition and local estimates for the pressure function in Orlicz spaces using the Riesz transform.

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