Weak solutions for the Stokes system for compressible non-Newtonian fluids with unbounded divergence

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Abstract

We investigate the existence of weak solutions to a certain system of partial differential equations, modelling the behaviour of a compressible non-Newtonian fluid for small Reynolds number. We construct the weak solutions despite the lack of the L^∞ estimate on the divergence of the velocity field. The result was obtained by combining the regularity theory for singular operators with a certain logarithmic integral inequality for BMO functions, which allowed us to adjust the method from (Feireisl et al., 2015) to more relaxed conditions on the velocity.