On the stability of generalized viscous heat-conducting incompressible fluids with non-homogeneous boundary temperature

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The motions of a generalized viscous heat-conducting incompressible fluid are governed by the non-standard Navier-Stokes-Fourier system where the non-linear viscosity depends on the shear-rate and the temperature. Assuming the fluid occupies a mechanically isolated container with a spatially non-homogeneous temperature boundary condition, the issue of stability concerns the investigation of the long-time behaviour of the fluid, which is expected to reach a steady state. The steady state is the state where the velocity field vanishes and the steady temperature field satisfies the steady heat equation with non-homogeneous boundary temperature. The aim of our study is to develop a rigorous stability analysis in the setting of weak solutions satisfying the equation for the entropy production. This is a joint work with Miroslav Bulíček and Petr Kaplický.