An existence result for thermoviscoelasticity at finite strains

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We describe recent work with Tomas Roubíček concerning the coupling of finite-strain visco-elasticity with temperature effects. Major nonlinearities arise through the static and time-dependent frame indifference, the thermomechanical coupling, and the viscous heating. Hence, we consider a regularized model (a so-called second-grade material) such that the deformation tensor is continuous and has a determinant bounded away from 0. The latter relies on a uniform version of the Healey-Krömer estimate. To control the time derivatives we rely on a generalized Korn inequality developed by Neff and Pompe.

A. Mielke, T. Roubíček. Thermoviscoelasticity in Kelvin-Voigt rheology at large strains. WIAS preprint 2584, arXiv:1903.11094.