

INSTABILITIES IN THERMOMECHANICS

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ABSTRACT

The theoretical and numerical description of material instabilities and localized deformation phenomena, based on the assumption of isothermal conditions, is quite mature by now, cf. for instance the book by D. Bigoni, Cambridge University Press, 2012.

The minisymposium is focused on unstable material and structural response in non-isothermal conditions. Theoretical studies, computational models as well as experimental research and simulations of thermo-mechanical behaviour are invited to be presented as long as they involve necking, shear bands or localized damage zones. Attention is not limited to phenomenological (macroscopic) description, micro-mechanical models and integration of scales of observation are also in the focus of the minisymposium.

In fact, geometrical, material and/or thermal softening can lead to the loss of uniqueness as well as localized deformation patterns and temperature variations. A spectrum of nonlinear constitutive descriptions dependent on temperature are also of interest. The response can be governed by one or more internal length parameters. Papers presenting non-standard coupled continuum models capable of describing instabilities are welcome, including non-local, micromorphic, gradient- or rate-dependent approaches.

Next to static instabilities, dynamic processes can also be considered (for instance Lueders bands). Theoretical formulation of instability indicators for coupled models and their implementation should be covered. Finally, algorithmic aspects of the models are in the scope of the minisymposium.