Constitutive stability and fracture: models and applications (Code Session 10)

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Abstract

In recent years, numerical applications of classical solutions for localization in solids had some success. In particular, the necessary condition for localization is well established as the instant when the PDE's lose strict hyperbolicity. The calculation of the subsequent crack (or shear band) region is however, less successful. Crack paths are often of difficult calculation. New (successful) studies of localization and new crack region calculations are therefore relevant.

These two related subjects will be considered in the mini-symposium: analysis of constitutive stability in solids and crack propagation. In the first, loss of strict hyperbolicity of the PDE system for any constitutive model, with or without thermal coupling, and the resulting fracture or shear band formation (damage-activated softening will be acceptable) are covered. Novel numerical solutions and unknown closed-form solutions are of interest. For crack propagation, any fracture model (Goodier-Barenblatt, Griffith, HRR) is acceptable and crack path analyses (localization analysis, COD, SIF, etc) are specially welcome. Contributions focusing in elasto-plastic and thermally-coupled discontinuities are also acceptable as are sessions with practical applications.