

Essen, 13.01.09

Einladung zum

Seminar Mechanik und Numerische Mathematik

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„Phenomenological approaches to large strain anisotropic elasto-plasticity: Theoretical aspects and basic problems“

A basic kinematical assumption in large strain elasto-plasticity concerns decomposition of deformations into an elastic and a plastic part. We begin with a discussion and comparison of the additive and multiplicative decompositions. Within thermodynamically consistent models these concepts are first applied to isotropic plasticity and examined in the case of simple shear. An analytical solution obtained for the case of small elastic but large plastic strains reveals inadequate response predicted by the model based on the additive decomposition of generalized strains. For this reason, we confine our attention in the following to the multiplicative decomposition of the deformation gradient. It is applied to the orthotropic and transversely isotropic material symmetries as most important from the engineering point of view. The elastic and plastic anisotropies are assumed to be persistent in the material but anisotropy axes can undergo a rigid rotation due to plastic deformations. The further characteristic features of the model are the principle of maximal plastic dissipation and the quadratic pressure-independent yield function formulated in terms of the generally non-symmetric Mandel stress tensor. Material constants appearing in the yield function obey constitutive inequalities ensuring positive definiteness of the plastic module as well as convexity of the yield surface in the 9-dimensional stress space. Some of these constants can be obtained from experimental data. Other constants govern the plastic spin, the role of which is further studied. To this end, we again consider finite simple shear characterized by large rotations.

Ort: Universität Duisburg-Essen, Campus Essen, **Raum T03 R03 D26**

Zeit: Freitag, den 06.02.2009 von 12.00 Uhr bis 13.00 Uhr

gez. Prof. Dr. A. Klawonn

gez. Prof. Dr.-Ing. J. Schröder