Institute of Thermomechanics Seminar

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Lecture No. 50

**Czech Society for Mechanics
and Institute of Thermomechanics, CAS**

invite you to a lecture and discussion within
the lecture series **Institute of Thermomechanics Seminar**

A nonlinear continuum theory of finite deformtions of elastoplastic media

given by

doc. Ing. Ladislav Écsi, PhD.

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Contemporary flow plasticity theories in finite-strain elasto-plasticity are either based on an additive decomposition of a strain rate tensor into an elastic part and a plastic part, or on a multiplicative decomposition of the deformation gradient tensor into an elastic part and a plastic part. While the former theories are considered to be ad hoc extensions of small-strain flow plasticity theories into the area of finite deformations to cover large displacements, but small strains in the material of the deforming body, the latter are now generally accepted as true finite-strain flow plasticity theories. Unfortunately, none of the theories entirely satisfies the requirements of thermodynamic consistency, and as a result, the material models and their analysis results, when used in numerical analyses, are dependent on the description and the particularities of the material model formulation. Recently a nonlinear continuum mechanical theory of finite deformations of elastoplastic media has been developed, which allows for the development of objective and thermodynamically consistent material models. This means that the plastic flow, including 'normality rules' can be described in a thermodynamically consistent manner in terms of different stress measures and strain rates or their objective derivatives, which are conjugate with respect to the mechanical power, using various instances of the yield surface defined in the above stress spaces. A few results of the modified hypo-elastoplastic and hyper-elastoplastic material models based on the aforementioned nonlinear continuum mechanical theory will be presented and discussed.

**The lecture will be held on Friday, June 22, 2018 at 12:00 in the building
of the Institute of Thermomechanics (lecture room B), Dolejškova 5, 182 00 Prague 8**

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