



## Lecture No. 84

Czech Society for Mechanics and Institute of Thermomechanics, CAS

invite you to a Research seminar on 17/02/2020

# Experimental and Numerical Procedures for Calibration of Advanced Phenomenological Models of Metal Plasticity

given by

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The talk summarizes the research done within author's internship at the Northern Arizona University, AZ, USA. Elastic domain of metals is bounded by the yield surface. When the material is loaded over the elastic limit, changes in size, position, and shape of the yield surface are observed. The new experimental procedure that employs hollow tubular specimens was developed to detect these phenomena. In the experiment, specimens are axially preloaded over the initial elastic limit to develop a distorted shape of the yield surface and consequently loaded by a sequence of combined axial load and torque to carefully probe the boundary of the elastic domain. This experimental methodology requires (i) a real-time evaluation of the effective plastic strain, and (ii) a real-time conditional control of the experiment.

The numerical part of this research focused on the calibration of current models of phenomenological plasticity on the experimental data of multiaxial ratcheting. These kinds of models usually feature about 10–20 material parameters and need to be calibrated numerically. The proposed calibration procedure employs numerical integration of models combined with the optimization method based on the gradient descent. The algorithm is coded in FORTRAN language.

**The lecture will be held on Monday, February 17, 2020 at 10:00 in the building  
of the Institute of Thermomechanics (lecture room B), Dolejšková 5, 182 00 Prague 8**