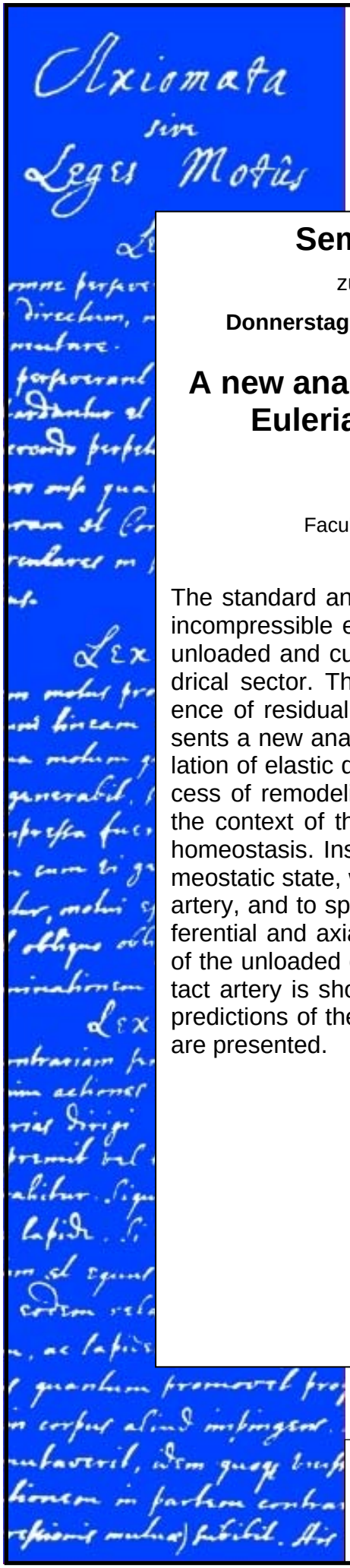

FRIEDRICH-ALEXANDER UNIVERSITÄT ERLANGEN-NÜRNBERG
TECHNISCHE FAKULTÄT

Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Donnerstag, 04.05.2017, 13:00 Uhr, Egerlandstr. 5, Raum 0.044

A new analysis of stresses in arteries based on a Eulerian formulation of growth in tissues

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The standard analysis of stresses in arteries considers the artery as an incompressible elastic circular cylindrical tube. When the intact artery is unloaded and cut transmurally, it springs open to a nearly circular cylindrical sector. The resulting nonzero opening angle indicates the existence of residual stresses in the unloaded intact artery. This paper presents a new analysis of stresses in arteries based on an Eulerian formulation of elastic deformations in soft tissues that models the inelastic process of remodeling (homeostasis) towards its homeostatic state. Within the context of this new analysis it is not necessary to model details of homeostasis. Instead, it is possible to directly determine the loaded homeostatic state, which is considered as the reference configuration of the artery, and to specify the geometry and associated values of the circumferential and axial stresses by matching measurements of the geometry of the unloaded open artery. The predicted geometry of the unloaded intact artery is shown to be accurate relative to the measurements. Also, predictions of the stress distributions for remodeling due to hypertension are presented.

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