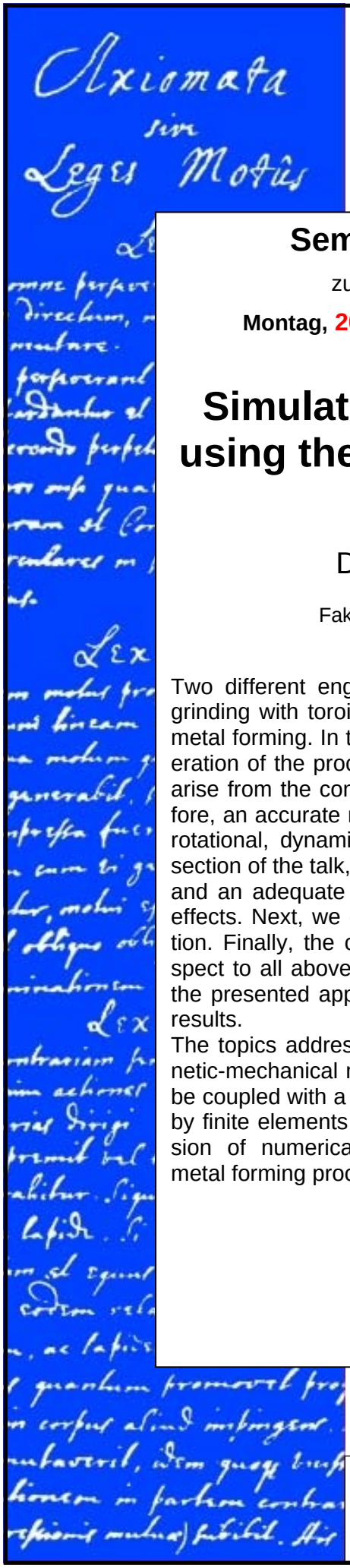

Friedrich-Alexander-Universität Erlangen-Nürnberg

Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Montag, 20.04.2009, 14:30 Uhr, Egerlandstr. 5, Raum 0.044

Simulation of Engineering Processes using the Arbitrary Lagrangian Eulerian (ALE) approach

Dipl. Math. Andreas Rademacher

Fakultät für Mathematik, Lehrstuhl LSX, TU Dortmund

Two different engineering processes are addressed in this talk: NC-shape grinding with toroid grinding wheels and coupled electromagnetic-mechanical metal forming. In the simulation of the NC-shape grinding process, the consideration of the process machine interactions is essential. All these interactions arise from the contact between the grinding wheel and the workpiece. Therefore, an accurate model of this contact is needed, which takes into account all rotational, dynamical, geometrical, frictional and thermal effects. In the first section of the talk, we introduce the general thermomechanical contact model and an adequate finite element discretisation, however, neglecting rotational effects. Next, we discuss rotation and use an ALE approach for their simulation. Finally, the complete model of the NC-shape grinding process with respect to all above mentioned effects is described. Numerical results illustrate the presented approach and show a qualitative agreement with experimental results.

The topics addressed in the second part of the talk are coupled electromagnetic-mechanical metal forming processes. Here, Maxwell's equations have to be coupled with a visco-plastic material law. The coupled system is discretised by finite elements using the ALE approach. The talk concludes with a discussion of numerical results concerning coupled electromagnetic-mechanical metal forming processes.

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