

*Axiomata
sive
Leges Motus*



Friedrich-Alexander-Universität
Erlangen-Nürnberg



Seminar über Fragen der Mechanik

zu folgendem Vortrag wird herzlich eingeladen

Dienstag, **06.03.2012, 14:15 Uhr**, Egerlandstr. 5, Raum 0.044

How contact interactions may depend on the shape of Cauchy cuts in N-th gradient continua: approach "à la D'Alembert"

Prof. Francesco dell'Isola

DISG, Università di Roma „La Sapienza“, Rome, Italy

Navier-Cauchy format for Continuum Mechanics is based on the concept of contact interaction between subbodies of a given continuous body. In this paper it is shown how -by means of the Principle of Virtual Powers- it is possible to generalize Cauchy representation formulas for contact interactions to the case of N-th gradient continua, i.e. continua in which the deformation energy depends on the deformation Green-Saint-Venant tensor and all its N-1 order gradients. In particular, the explicit representation formulas to be used in N-th gradient continua to determine contact interactions as functions of the shape of Cauchy Cuts are derived. It is therefore shown that

- i) these interactions must include edge (i.e. concentrated on curves) and wedge (i.e. concentrated on points) interactions, and
- ii) these interactions cannot reduce simply to forces: indeed the concept of K-forces (generalizing similar concepts introduced by Rivlin, Mindlin, Green and Germain) is fundamental and unavoidable in the theory of N-th gradient continua.

Prof. Dr.-Ing. P. Steinmann
Prof. Dr.-Ing. K. Willner

Lehrstuhl für Technische Mechanik
Egerlandstraße 5, 91058 Erlangen

Prof. Dr.-Ing. S. Leyendecker

Lehrstuhl für Technische Dynamik
Konrad-Zuse-Straße 3-5, 91052 Erlangen