

Seminar

05. Mai 2010 15:30h HS 44-465



zu folgendem Vortrag wird herzlich eingeladen:

Computational modelling of active tissues

Markus Böl

Technical University at Braunschweig

In the present work a new concept for the modelling of skeletal muscles is proposed. An important aspect is the fact that the concept is micro-mechanically motivated. At the level of the contractile muscle fibres we incorporate the behaviour of the smallest possible unit, the so-called sarcomere, also known as microbiological engine. In doing so, a generalised anisotropic hyperelastic constitutive model in combination with a micro-mechanically based muscle activation is used to describe the contraction behaviour of skeletal muscle tissue. In contrast to earlier approaches the model is not an additive composition of active and passive parts but contains an activation dependent parameter that controls both, contraction and force development. By this means, we are able to describe the behaviour of skeletal muscle in a realistic way. The predictive features of the model will be demonstrated through the simulation of skeletal muscles. First, some general studies are used to demonstrate the capability of the new concept. Then, we apply the modelling concept to real muscle structures. In conclusion, the present study has the advantage that a three-dimensional model is available which allows us to take into account many physiological processes at the micro level.



Prof. Dr.-Ing. habil. Sven Klinkel
Fachgebiet
Statik und Dynamik der Tragwerke
TU Kaiserslautern



Dr.-Ing. Sigrid Leyendecker
Emmy Noether Group
Computational Dynamics and Control
TU Kaiserslautern



Prof. Dr.-Ing. habil. Ralf Müller
Lehrstuhl für Technische Mechanik
TU Kaiserslautern