



Der Arbeitsbereich für Geometrie und CAD lädt zu folgendem Vortrag ein:

**Recent Developments in Multibody Dynamics with Applications to  
Biomechanics, Vehicle Dynamics and Space Structures.**

**Professor Jorge A.C. Ambrósio**

IDMEC/IST Instituto Superior Técnico Lisboa (Portugal)  
Editor in Chief of Multibody System Dynamics (Springer)

**Abstract:**

A wide number of engineering and biological systems find among the multibody approaches irreplaceable methodologies to deal with the analysis needs of complex nonlinear phenomena with, sometimes, long durations. The ability of multibody dynamics to describe in an integrated form not only the general dynamics of complex mechanical systems but also the non-smooth aspects concerning with contact or interactions with other media, generally described using other computational methods, allows for its application to vehicle dynamics, biomechanics and space structures and mechanisms, among others. This is typically the case in which fluid-structure interactions play a role, such as the case of the aerodynamic effects, approached via finite elements or particle methods to describe the fluid and flexible multibody dynamics to describe the vehicle components. In this seminar recent developments multibody dynamics with emphasis in applications to vehicle dynamics, crashworthiness, pantograph-catenary interaction, fluid structural loading, biomechanics and flexible mechanical systems will be presented. In the process, different methodological aspects will be reviewed in face of these application needs. The importance of the kinematic joints flexibility in the dynamics of the system and the modelling of imperfect joint versus ideal kinematic joints are discussed. Contact mechanics issues associated not only to wheel-rail contact but also to the pantograph-catenary interaction and to the biomechanics of impact of railway vehicle occupants will be addressed. Finally, the use of flexible multibody dynamics in the modelling of railway applications versus the use of standard finite element methods will be debated in the framework of the foreseen applications.

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