Halmstad Colloquium talk 2012-11-23:

Differential-Algebraic Equations in Multibody Dynamics

by **professor Claus Führer, Lund University, Sweden**

Abstract:
Equations of motion of constrained multibody systems are differential-algebraic equations of index 3. In this talk an introduction to this class of ordinary differential equations is given and the concept of index and index reduction is introduced. Special focus will be put on the numerical treatment of these equations by multistep methods. Equations of motion can also be transformed to state space form (minimal coordinate formulation), there is a formulation based on coordinate partitioning and they occur as overdetermined differential algebraic systems. These variants have an direct impact on the numerical solution process and its quality. This will be the topic of the last part of the talk.

About:
Claus Führer is a Professor of Scientific Computing at Lund University (LTH) and is specialized on simulation of mechanical systems. Before he was at DLR (German Center for Aerospace and Aeronautics) and there responsible for the numerical kernel of SIMPACK. He published a monograph on Numerical Methods in Multibody Dynamics and acted as consultant for various companies.