



## **MAGDEBURG LECTURES ON OPTIMIZATION AND CONTROL**

### **Moritz Diehl**

30.05.2013 - **Autogeneration of Nonlinear Optimal Control Algorithms for Embedded Hardware and Application to Tethered Airplane Control**

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### **Time & Place**

The presentation on May 30, 2013 will be given in the Lukas Klause › (Schleiufer 1, 39104 Magdeburg) (<http://ifatwww.et.uni-magdeburg.de/syst/maloc/seminars/Standort%20Lukas%20Klause.pdf>) and starts at 5.30 p.m.

### **Abstract**

Nonlinear Model Predictive Control (NMPC) is a feedback control technique that uses the most current state estimate of a nonlinear system to compute an optimal plan for the future system behaviour. This plan is recomputed in every sampling time, creating feedback. Thus, NMPC needs to repeatedly solve a nonlinear optimal control problem. Recent algorithmic progress makes the solution of NMPC optimization problems possible at sampling times in the milli and microsecond range.

This talk describes some of the recent algorithmic developments that made it possible to solve classical NMPC benchmark problems with computation times below even one microsecond. We also present experimental results where the algorithms are used for state estimation and feedback control of tethered airplanes that are intended for airborne wind power generation.

### **Information about the Speaker**

since 2006: Associate professor (with tenure), ESAT-SCD, K.U. Leuven, and PI of OPTEC  
2001-2006: Scientific assistant (C1) at IWR, Heidelberg University  
spring 2005: research stay at Univ. Paul Sabatier, Toulouse  
spring 2003: Long term fellow at IMA, University of Minnesota, USA  
spring 2002: research stay at INRIA Rocquencourt  
1999-2001: PhD at IWR, Heidelberg University (summa cum laude)  
1993-99: Diploma of Physics at Heidelberg University (with distinction)