Estimation of Parameters in Optimal Control Problems

J. P. Schlöder[1]

Abstract: Dynamic processes are often modelled as initial or boundary value problems in nonlinear differential equations. However, in certain situations it can be assumed that the observed behavior of a dynamic process is the solution of a parameter dependent optimal control problem.

Determination of parameters in such models leads to challenging parameter estimation problems. The talk motivates this kind of hierarchical optimization problems, discusses their features and describes approaches for their numerical solution.

These comprise Generalized Gauss-Newton methods for nonlinear constrained least squares problems, direct and indirect methods for the treatment of constrained optimal control problems and structure exploiting methods for the evaluation and solution of quadratic subproblems.

Numerical results for selected benchmark problems are given.

The talk is based on joint work with Hans Georg Bock, Kathrin Hatz and Katja Mombaur.

[1] Interdisciplinary Center for Scientific Computing (IWR)
University of Heidelberg
Im Neuenheimer Feld 368, 69120 Heidelberg, Germany
johannes.schloeder@iwr.uni-heidelberg.de