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17. Control Theory and Optimization

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Optimal Control of Large Scale DAE Systems in Chemical Engineering

In chemical process control challenging problems for numerical optimal control methods arise very often. Those problems are generally governed by large scale differential-algebraic equations. A new direct multiple shooting method for the numerical solution of those problems is presented. The method exploits the particular structure of the system equations and allows to formulate the control problem as a multistage process so that state and/or control space dimension as well as objective function and path constraints may vary from stage to stage. Moreover, this is advantageous for parallelization techniques, too, and leads to a new divide and conquer method. Numerical results are presented for some real life problems.