High-order discretization and multigrid solution of constrained optimal control problems

Alfio Borzi[1] <alfio.borzi@uni-graz.at>

There is theoretical and experimental evidence that multigrid methods can solve optimal control problems with optimal computational complexity and that they are robust with respect to the choice of values of the optimization parameters. Present results refer to optimization problems discretized by second-order schemes.

In this contribution, we discuss multigrid schemes for higher-order discretization of optimality systems. In particular, we focus on different choices of discretization for the state and for the adjoint equation.

Results are reported for control-constrained nonlinear optimal control problems demonstrating typical multigrid efficiency and robustness. Preliminary results on state-constrained optimal control problems are also presented.

---

[1]University Graz, Institute for Mathematics and Scientific Computing