

A new iterative concept for solving linear-quadratic optimal control problems

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We consider a linear-quadratic optimal control problem governed by an elliptic partial differential equation with pointwise control constraints, where the PDEs are solved by a finite element method. Such problems are usually treated by multilevel iterative methods. We present a new error estimation technique for a current iterate with respect to the solution of the discretized problem. These error estimates can be used as stopping criteria for iterative methods. The presented theory is illustrated by numerical examples, where a primal-dual active set strategy and a CG-algorithm as iterative methods are used. The final aim is to find a balance between the different errors (including the discretization error) of the over-all solution process.

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