

Discretization Error Estimates for very weak Solutions of Elliptic Boundary Value Problems

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The investigation of Dirichlet control problems with L^2 -regularization leads to the consideration of very weak solutions of boundary value problems. We discretize them here with piecewise linear finite elements on graded meshes and analyze the error in various norms. The critical detail is that we cannot use Céa's lemma since the solution is in general not in H^1 . These results close a gap in the analysis of the discretization of Dirichlet control problems on graded meshes.

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