Finite element analysis for $H^{(2,1)}$-elliptic equations

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The convergence of finite element methods for linear elliptic equations of second or fourth order is well understood. In this paper we discuss the finite element approximation of linear elliptic equations of mixed second and fourth order in a two-dimensional rectangular domain. We establish an estimate for the finite element error of a conforming approximation of this equation.

This type of equation appears in the optimal control of parabolic partial differential equations if one eliminates the state or the control in the first order optimality conditions.

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