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# Optimal Coefficients for Elliptic PDEs

We consider an optimization problem related to elliptic PDEs of the form $-\mathrm{div}(a(x)\nabla u) = f$ with Dirichlet boundary condition on a given domain $\Omega$. The coefficient $a(x)$ has to be determined, in a suitable given class of admissible choices, in order to optimize a given criterion. We first deal with the case when the cost is the so-called elastic compliance, and then we discuss the more general case when the problem is written as an optimal control problem.

**Keywords**: Shape optimization, optimal coefficients, regularity, optimal control problems.

**MSC**: 49Q10, 49J45, 35B65, 35R05, 49K20.