OPTIMAL ELLIPTIC REGULARITY NEAR HETEROGENEOUS VERTICES

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Let $\Omega \subseteq \mathbb{R}^3$ be a polyhedral domain and P one of its vertices. We consider an elliptic problem with Neumann boundary conditions on Ω, where the coefficient matrix of the differential operator in divergence form is piecewise constant on a polyhedral partition of Ω, i.e. Ω consists of several different anisotropic materials.

The aim is to show optimal elliptic regularity results for the solution in a neighbourhood of P even if some (or several) material interfaces run into P. These questions are intimately related to edge and vertex singularities and thus to the location of singular values of some generalised Sturm-Liouville problems.

This is joint work with Hans-Christoph Kaiser and Joachim Rehberg