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**A Multigrid Prolongation Method based on local
Minimization of the constant in the strengthened
Cauchy-Schwarz Inequality**

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We discuss ways to construct prolongation operators for multigrid methods both for geometric and pure algebraic settings. Our theoretical derivation of the prolongation operator is based on finite element analysis, in detail we try to minimize the constant in the strengthened Cauchy-Schwarz inequality locally. Therefore, we first write the fine grid space as a direct sum of the coarse grid space and a suitable complementary space. The local coarse subspaces are chosen such that they can locally represent the kernel of the operator. In order to solve the arising local minimization problems and to determine the prolongation weights only a few local operations are required. We show first numerical results in 2D and outline applications of our method like linear elasticity.