

Block Jacobi, Schwarz, and Discontinuous Galerkin

Martin Gander¹

Abstract

For classical discretizations of elliptic partial differential equations, like conforming finite element methods (FEM) or finite difference methods (FDM), block Jacobi iterations are equivalent to classical Schwarz methods (with Dirichlet transmission conditions). This is however not necessarily the case for the more recent discontinuous Galerkin finite element methods (DGFEM). I will show for the model problem of the Poisson equation and various DGFEM discretizations that a block Jacobi method applied to the discretized problem can be interpreted as a Schwarz method with different transmission conditions from the classical Dirichlet ones. I will illustrate the results with numerical experiments.

¹Université de Genève