Schwarz preconditioners for Discontinuous Galerkin method

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We present a class of two level Schwarz preconditioners for the Discontinuous Galerkin (DG) method applied to second order elliptic problems. The preconditioners are based on a decomposition of the computational domain into non-overlapping subdomains and a coarse space that captures the global behavior of the solution. We analyze the convergence properties of the preconditioned system and demonstrate that the condition number is scalable with respect to the mesh size. Numerical experiments confirm the theoretical results and show that the proposed preconditioners are effective in reducing the number of iterations required for convergence, making them suitable for large-scale DG simulations.

References:

[1] https://arxiv.org/abs/2502.06405

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