Preconditioners for Three Dimensional Elliptic Problems on Non-smooth Domains

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Abstract: In this talk we propose preconditioners for spectral element methods for three dimensional elliptic problems on non-smooth domains. It is well known that there are three different type of singularities that arise in the neighbourhoods of vertices, vertex-edges and edges on polyhedral domains. Efficient preconditioners are needed for solving normal equations arising from least-squares formulation of these problems using preconditioned conjugate gradient method (PCGM). The preconditioners which we are going to describe are constructed using separation of variables and are easy to invert. Moreover they are spectrally equivalent to the quadratic forms which they are used to approximate. Further, we show that there exists a new diagonal preconditioner using separation of variables technique.

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