Numerical modelling of elliptic problems on octree-based meshes

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We consider problems governed by a linear elliptic equation with varying coefficients across internal interfaces. The gradient of the solution can undergo significant variations through these internal boundaries. We present a compact finite-difference scheme on a tree-based adaptive grid that can be efficiently solved using a natively parallel data structure.Numerical illustrations are presented in two and three-dimensional configurations [1]. Future perspectives will include the use of Hybrid High-Order methods to increase the approximation order [2].

Références

[1] Raeli Alice and Bergmann Michel and Iollo Angelo, *A finite-difference method for the variable coefficient Poisson equation on hierarchical Cartesian meshes*, Journal of Computational Physics, 2018.

[2] Daniele A. Di Pietro and Alexandre Ern, *Hybrid high-order methods for variable-diffusion problems on general meshes*, Comptes Rendus Mathematique, 2015.

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