3D multi-material polyhedral methods for diffusion

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ABSTRACT

The process of energy diffusion is an important physical mechanism for the exchange within materials and across material interfaces. For the Arbitrary Lagrangian Eulerian or pure Eulerian frameworks, material boundaries will be miss-aligned with the computational mesh creating multi-component or mixed cells. To capture the dynamics of energy diffusion in mixed cells we will describe an implicit 3D multi-material polyhedral based scheme. In this paper we will also outline an alternative scheme based upon explicit super-time stepping. We will present results, and compare and contrast the different approaches.