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High order discretization of interfacial jump conditions for the Poisson equation on Cartesian grids AMIR RIAZ, University of Maryland, KEEGAN DELANEY, ELIAS BALARAS, George Washington University — A robust, 2^{nd} order accurate discretization method for both Dirichlet and Neumann jump conditions at sharp discontinuities in space is developed for the Poisson equation with spatially varying, discontinuous coefficients. The method advances previous approaches that are based on either 1^{st} order treatment of jumps across discontinuities or employ implementations that are not robust for 2-D and 3-D applications with moving interfaces. This particularly simple and robust approach to higher order discretization is based on the volume-fraction weighted average of the solution variables at cell centers. The resulting coefficient matrix for the Poisson equation remains symmetric and can be inverted by the available fast solver algorithms. Examples and algorithmic details will be discussed.

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