## Reducing contrast dependency in numerical upscaling of elliptic problems

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## ABSTRACT

We consider elliptic problems where the coefficient is both spatially rapidly oscillating (multiscale) and where the ratio between its highest and lowest value in the domain is large (high contrast). The multiscale property typically requires a very fine mesh for a finite element discretization to yield an accurate solution. One way to deal with this difficulty is to construct a low-dimensional approximate space by modifying the basis functions of a standard low-dimensional finite element space (numerical upscaling). The localized orthogonal decomposition (LOD) is a numerical upscaling method, that is defined by the choice of an interpolation operator. For many choices of the interpolation operator, the solution accuracy decays rapidly with increasing contrast. In this talk, I discuss this contrast dependency, and how to construct interpolation operators to substantially reduce it.