

MULTIRESOLUTION SUPER-LOCALIZED ORTHOGONAL DECOMPOSITION

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We introduce a novel multiresolution super-localized orthogonal decomposition (SLOD) for the approximation of elliptic partial differential operators with arbitrarily rough coefficients. The method merges the concepts of (S)LOD and operator-adapted wavelets (gamblets). It computes hierarchical bases that block-diagonalize the partial differential operator and thereby decouple the discretization scales. At the same time, sparsity is enforced by a novel localization strategy that leads to a super-exponential decay of the basis functions relative to their discretization scales within the hierarchy.

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