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Multiscale GFEM for High Contrast Suspensions Using Optimal Local Basis Functions. Preliminary report.

We evaluate a multiscale GFEM using optimal spectral basis functions developed in recent work by I. Babuska, R. Lipton, and X. Huang. This method is applied to compute local fields inside high contrast particle suspensions. We evaluate the method's performance for various examples with different contrasts between reinforcement particles and matrix material. For suspensions of particles with a minimum distance between neighboring particles the numerical experiments agree with new theoretical estimates that show the convergence rate is exponentially decreasing and independent of the elastic properties of particles and matrix materials. (Received September 12, 2016)