A pointwise two-scale expansion for equations with random coefficients

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Abstract

Quantitative stochastic homogenization of operators in divergence form has witnessed important progress recently. Our goal is to go beyond the error bound to analyze statistical fluctuations around the homogenized limit. We prove a pointwise two-scale expansion for equations in divergence form. The approach is probabilistic. The main ingredients include the Kipnis-Varadhan method applied to reversible diffusion in random environment and a quantitative martingale central limit theorem.

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