

Stochastic homogenisation of high-contrast media

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Abstract

Using a suitable stochastic version of the compactness argument of V. V. Zhikov, we develop a probabilistic framework for the analysis of heterogeneous media with high contrast. We show that an appropriately defined multiscale limit of the field in the original medium satisfies a system of equations corresponding to the coupled “macroscopic” and “microscopic” components of the field, giving rise to an analogue of the “Zhikov function”, which represents the effective dispersion of the medium. We demonstrate that, under some lenient conditions within the new framework, the spectra of the original problems converge to the spectrum of their homogenisation limit.

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