SPECTRAL MEASURE COMPUTATIONS FOR COMPOSITE MATERIALS

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The paper gave an overview of the analytic continuation method of homogenization theory and integral representation of effective quantities (parameters such as effective conductivity) based on a spectral measure which encodes geometric information of the composites.

For actual computing, the authors studied discretizations of the integral presentation in terms of spectral decompositions of real symmetric random matrices, formulas (2.40) and (2.51). Examples of 2d and 3d isotropic and anisotropic random media are shown, with numerical results compared favorably with theory or within the known bounds.

I recommend the paper for publication in the special issue of CMS if the authors could clarify the issues below.

(I) In the numerical section (section 3), there appear to be no information on which method the eigenvectors and eigenvalues of the symmetric matrix M_1 are computed with, the complexity of the method as a function of the matrix size N.

(II) How large is N to be able to approximate well the infinite lattice ? What does such N depend on ?