Seminar/Talk

Optimal artificial boundary conditions for three-dimensional elliptic random media

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Host: Julian Fischer

We are interested in computing the electrical field generated by a charge distribution localized on scale \ell in an infinite heterogeneous medium, in a situation where the medium is only known in a box of diameter L?\ell around the support of the charge. We propose an artificial boundary condition that with overwhelming probability is (near) optimal with respect to scaling in terms of \ell and L, in the setting where the medium is a sample from a stationary ensemble with a finite range of dependence (set to be unity and in the regime 1?\ell). The boundary condition is motivated by stochastic homogenization that allows for a multipole expansion [Bella, Giunti, Otto 2020]. This work extends [Lu, Otto, 2021] from two to three dimensions, which requires taking quadrupoles, next to dipoles, into account. This in turn relies on stochastic estimates of second-order, next to first-order, correctors. These estimates are provided for finite range ensembles under consideration, based on an extension of the semigroup approach of [Gloria, Otto 2015]. Joint work with Jianfeng Lu (Duke) and Felix Otto (MPI).

Tuesday, July 19, 2022 04:15pm - 05:15pm

Heinzel Seminar Room / Office Bldg West (I21.EG.101)

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