



THE UNIVERSITY OF CHICAGO

Departments of Computer Science, Mathematics, Statistics, and the Computation Institute
SCIENTIFIC AND STATISTICAL COMPUTING SEMINAR

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Two Topics in Nonperiodic Homogenization

FRIDAY, October 25, 2013, at 1:30 PM
Eckhart Hall, Room 117, 5734 S. University Avenue

ABSTRACT

We will present some recent mathematical and numerical contributions related to nonperiodic homogenization. The setting is simple, namely that of a scalar elliptic equation with an highly oscillatory coefficient. The difficulty is that this coefficient is not assumed periodic, nor ergodic stationary. It typically models a structure with a set of embedded localized defects. Our goal is then to construct a theoretical setting, and next a numerical approach providing an efficient approximation of the solution that is accurate at the vicinity of the defects. In addition, we are also interested in deriving approximation schemes for the homogenized coefficients that do not necessarily require the possibly prohibitively computationally expensive computation of the corrector function. We will develop an alternative numerical strategy to achieve this.

The works are joint works with Xavier Blanc (Paris 7) and Pierre Louis Lions (College de France) for the former problem, and Frederic Legoll (Ecole des Ponts) for the latter problem.

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