数学与系统科学研究院

计算数学所学术报告

报告人：　Prof. Leonid Berlyand

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报告题目：

Finite dimensional homogenization approximation in problems with many non–separated scales

邀请人：　明平兵研究员

报告时间：　2009 年 6 月 9 日(周二)

下午 4:00—5:00

报告地点：　科技综合楼三层 301

计算数学所报告厅

Abstract:

In joint work with H. Owhadi (Caltech), we investigate the homogenization of divergence form elliptic (scalar and vectorial) equations with arbitrary bounded coefficients (in particular, in situations where assumptions of scale separation and/or ergodicity are not satisfied). We prove the existence of an h– basis that is superior to standard piecewise polynomial bases with the same number of degrees of freedom. Moreover we obtain an explicit error constant for h–basis approximations, which is independent of the contrast of the material properties and geometry of its microstructure. We also discuss minimization of the number of ” cell” (precomputed) problems for homogenization with arbitrary bounded coefficients and show that this issue is related to a new class of elliptic inequalities. Finally, we will discuss potential

applications of this work ranging from brain damage and virtual liver surgery to reservoir modeling and upscaling of atomistic models. If time permits, we will discuss most recent results on the transfer property of the flux norm that drastically simplifies the analysis.

欢迎大家参加！