

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Jie Shen**

(*Purdue University and Xiamen University*)

报告题目:

**Efficient and Stable Spectral Methods
for scattering in unbounded rough
surfaces, and a direct fast Chebyshev
method for problems with variable
coefficients**

邀请人: 明平兵 研究员

报告时间: 2013 年 7 月 9 日 (周二)

下午 16:00-17:00

报告地点: 科技综合楼三层 301

计算数学所小报告厅

Abstract:

The talk consists of two parts.

In the first part, I shall present an efficient and stable spectral algorithm for solving the unbounded rough surface scattering problem, which is referred to as a non-local perturbation of an infinite plane surface such that the whole surface lies within a finite distance of the original plane. The method uses a transformed field expansion to reduce the boundary value problem with a complex scattering surface into a successive sequence of transmission problems of the Helmholtz equation with a plane surface. We then construct a special algorithm using Hermit functions to fully decouple the problem into a sequence of one-dimensional two-point boundary value problems with piecewise constant wavenumbers, which can be solved efficiently by a spectral-element method. I shall present ample numerical results to show that the new spectral method is efficient, accurate, and well suited to solve the scattering problem by unbounded rough surfaces.

In the second part, I shall present a direct fast Chebyshev method for solving elliptic equations with variable coefficients.

欢迎大家参加!