数学与系统科学研究院

计算数学所定期学术报告

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报告题目：

A numerical mode matching method for wave scattering in a layered medium

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报告时间：**2019** 年 **3** 月 **21** 日（周四）

下午 **16:00-17:00**

报告地点：　　思源楼一层

大报告厅

Abstract:

Numerical mode matching (NMM) methods are widely used for analyzing wave propagation and scattering in structures that are piecewise uniform along one spatial direction. For open structures that are unbounded in transverse directions (perpendicular to the uniform direction), the NMM methods use the perfectly matched layer (PML) technique to truncate the transverse variables. When incident waves are specified in homogeneous media surrounding the main structure, the total field is not always outgoing, and the NMM methods rely on reference solutions for each uniform segment. Existing NMM methods have difficulty handing grazing incident waves and special incident waves related to the onset of total internal reflection, and are not very efficient at computing reference solutions for non-plane incident waves. In this talk, we will introduce a new NMM method to overcome these limitations. A hybrid Dirichlet-Robin boundary condition is proposed to ensure that non-propagating and non-decaying wave field components are not reflected by truncated PMLs. Exponential convergence of the PML solutions based on the hybrid Dirichlet-Robin boundary condition is established theoretically. A fast method is developed for computing reference solutions for cylindrical incident waves. The new NMM is implemented for two-dimensional structures and polarized electromagnetic waves. Numerical experiments are carried out to validate the new NMM method and to demonstrate its performance.

欢迎大家参加！