数学与系统科学研究院

计算数学所网络学术报告

报告人： 曹阳 教授

（ 南通大学交通与土木工程学院 ）

报告题目：

Additive Inexact Block Triangular Preconditioners for Meshfree Discretized Piezoelectric Equations

邀请人： 白中治 研究员

报告时间：2021 年 10 月 2 日（周六）

晚上 **19:00-20:00**

报告工具：腾讯会议 **ID**：（**610 724 982**）

Abstract：

The radial point interpolation meshfree (RPIM) method is a very efficient numerical framework for the analysis of piezoelectric equations. Due to the mechanical-electrical coupling characteristics, the coefficient matrix of RPIM discretized piezoelectric equations is of block two-by-two saddle point structure and very ill conditioned. In this paper, based on the specific RPIM discretization process, a class of additive inexact block triangular (AIBT) preconditioners are proposed for the discretized two-dimensional piezoelectric equations. In the AIBT preconditioners, the (1,1) leading block is taken as the block diagonal part of the elasticity operator. The (2,2) block is an approximation of the exact Schur complement matrix and additively assembled by small exact Schur complement matrix in each background cell. The proposed AIBT preconditioners have the advantages of easy construction and sparse structure. It is proved that the (1,1) block and (2,2) block of the AIBT preconditioners are spectrally equivalent to the (1,1) block of the discretized piezoelectric equation and the exact Schur complement matrix, respectively. Finally, two numerical examples are given. Numerical results show that the AIBT preconditioned Krylov subspace iteration methods converge very fast and the iteration steps are independent of degrees of freedom.

欢迎大家参加！