

抛物问题的拉格朗日乘子区域分解法*

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SOLVING PARABOLIC PROBLEMS BY DOMAIN DECOMPOSITION METHODS WITH LAGRANGIAN MULTIPLIERS

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Abstract

In this paper we consider domain decomposition methods with Lagrangian multipliers, which are applied to solving parabolic problems. We shall estimate condition numbers of the resulting interface matrices, and construct two kinds of simple preconditioners for the corresponding interface equations. It will be shown that the condition numbers of the resulting preconditioned interface matrices are almost optimal.

Keywords: domain decomposition, nonmatching grids, Lagrangian multipliers, preconditioner, condition number

关键词: 区域分解, 非匹配网格, 拉格朗日乘子, 预条件子, 条件数

1. 引言

近年来, 一类新的非重叠区域分解方法——非匹配网格区域分解法, 日益引起人们的广泛兴趣, 并已成为当今区域分解方法研究的热门课题. 这类区域分解方法的特点是: 相邻子区域在公共边(或面)上的结点可以不重合, 从而能解决许多传统区域分解方法不便解决的问题(如变动网格问题). 目前主要有两类方法来处理这种区域分解的强非协调性: Mortar元法(见 [1-2] 和 [9-10]) 和拉格朗日乘子法(见 [5], [8], [11] 和 [12]). 拉格朗日乘子法比

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