

四阶微分方程 Dirichlet 边值问题 特征值估计与重数研究

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摘要： 本文研究了在 Dirichlet 边界条件下的四阶 Sturm-Liouville 特征值问题。首先，文中给出了初值问题基本解组的估计以及特征值的等价定义。之后，证明了特征值的实值性与可数性。同时，计算得出 Dirichlet 边值条件下，几何重数与代数重数都等于 1。本文的研究是对文献[8]中二阶 Sturm-Liouville 方程特征值的相关问题的推广。

关键词： 四阶 Sturm-Liouville 方程 Dirichlet 边值条件 边值问题 特征值 代数重数 几何重数 解的估计 实值性 可数性

Abstract: In this paper, we study the fourth-order Sturm-Liouville eigenvalue problems with Dirichlet boundary condition. Here we first present some useful estimations of the fundamental solutions of initial problems and an equivalent definition of the eigenvalues. Then we prove that the eigenvalues are real and countable. Meanwhile, we also conclude that algebraic and geometric multiplicities are both equal to 1. All these discussions are the improvement of the second-order Sturm-Liouville eigenvalue problems in bibliography [8].

Key words: Sturm-Liouville problem eigenvalue Dirichlet boundary condition estimation of the solutions Fourth-Order equation real countable algebraic and geometric multiplicities