



满足Dirichlet边界条件的2阶奇异微分方程的正解

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Positive Solutions of Second-Order Singular Differential Equations with Dirichlet Boundary Condition

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摘要 研究了非线性2阶Dirichlet 边值问题 $u''(t)-\lambda u(t)+h(t)f(t,u(t))+g(t,u(t))=0, 0<t<1, u(0)=u(1)=0$ 的正解存在性与多解性, 其中 $\lambda>-\pi^2$ 是常数, 而 $g(t,u)$ 可以在 $u=0$ 处奇异. 通过精确估计解的先验界并且利用锥拉伸-压缩的Guo-Krasnoselskii不动点定理, 建立了几个存在定理.

关键词: 非线性常微分方程 奇异边值问题 正解 存在性与多解性

Abstract: The existence and multiplicity of positive solutions are studied for the nonlinear second-order Dirichlet boundary value problem $u''(t)-\lambda u(t)+h(t)f(t,u(t))+g(t,u(t))=0, 0<t<1, u(0)=u(1)=0$, where $\lambda>-\pi^2$ is a constant and $g(t,u)$ may be singular at $u=0$. By exactly estimating the priori bound of solution and applying the Guo-Krasnoselskii fixed point theorem of cone expansion-compression type, several existence theorems are established.

Key words: nonlinear ordinary differential equation singular boundary value problem positive solution existence and multiplicity

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