论文

非线性项依赖一阶导数共振情形下二阶三点BVP解的存在唯一性

李晓静[1], 陈绚青[1], 鲁世平[2]

1. 江苏技术师范学院数理学院, 常州 213001;
2. 安徽师范大学数学系, 芜湖 241000

Existence and Uniqueness of Three-point Boundary Value Problem at Resonance with Nonlinear Term Depending on the First Order Derivative

LI Xiaojing[1], CHEN Xuanqing[1], LU Shiping[2]

1. College of Mathematics and Physics, Jiangsu Teachers University of Technology, Changzhou 213001;
2. Department of Mathematics, Anhui Normal University, Wuhu 241000

- 摘要
- 参考文献
- 相关文章

全文: PDF (275 KB)   HTML (1 KB)   输出: BibTeX | EndNote (RIS)   背景资料

摘要 本文致力于研究共振情形下二阶三点边值问题 $x''(t)+f(t,x(t),x'(t))=0$, $t\in (0,1)$, $x(0)=0$, $x(1)=\xi x(\eta)$, 其中 f: $[0,1]\times R^2 \to R$ 是一个连续函数, $\xi>0$, $0 < \eta < 1$ 满足 $\xi\eta=1$. 运用先验界估计, 微分不等式技巧和Leray-Schauder度理论得到了该边值问题解的存在性和唯一性.

关键词: 非线性边值问题   存在性和唯一性   共振   上下解   Leray-Schauder度

服务
- 把本文推荐给朋友
- 加入我的书架
- 加入引用管理器
- E-mail Alert
- RSS

Abstract: This paper is devoted to studying the second-order three point boundary value problem ar resonance $x''(t)+f(t,x(t),x'(t))=0$, $t\in (0,1)$, $x(0)=0$, $x(1)=\xi x(\eta)$, where f: $[0,1]\times R^2 \to R$ is continuous, $\xi>0$, $0 < \eta < 1$ such that $\xi\eta=1$. The existence and uniqueness of solution of the boundary value problem are given by using priori estimates, differential inequalities technique and Leray-Schauder degree theory.

Key words: nonlinear boundary value problem   existence and uniqueness   resonance   upper and lower solutions   Leray-Schauder degree

作者相关文章
- 李晓静
- 陈绚青
- 鲁世平

引用本文:

李晓静,陈绚青,鲁世平. 非线性项依赖一阶导数共振情形下二阶三点BVP解的存在唯一性[J]. 应用数学学报, 2012, (2): 375-380.

LI Xiaojing,CHEN Xuanqing,LU Shiping. Existence and Uniqueness of Three-point Boundary Value Problem at Resonance with Nonlinear Term Depending on the First Order Derivative[J]. Acta Mathematicae Applicatae Sinica, 2012, (2): 375-380.

[1]   II' in V A, Moiseev E I. Nonlocal Boundary Value Problems of the First Kind for a Strum-Liouville Operator in Its Differential and Fin Difference Aspects. *J. Differential Equations*, 1987, 23(7): 803-810

[2]   II' in V A, Moiseev E I. Nonlocal Boundary Value Problems of the Second Kind for a Strum-Liouville Operator in Its Differential and Finite Difference Aspects. *J. Differential Equations*, 1987, 23(8): 979-987

[3]   Gupta C P. A Sharper Condition for the Solvability of a Three-point Second-order Boundary Value Problem. *J. Math. Anal. Appl.*, 1 205: 579-586

[4]   Gupta C P, Trofimchuk S. Existence of a Solution to a Three-point Boundary Value Problem and the Spectral Radius of a Related

Linear Operator. *Nonlinear Anal.*, 1998, 34: 498-507

[5] He X M, Gei W G. Triple Solutions for Second Order Three-point Boundary Value Problems. *J. Math. Anal. Appl.*, 2002, 268: 256-26

[6] Ma R Y. Multiplicity Results for a Three-point Boundary Value Problems at Resonance. *Nonlinear Anal. TMA.*, 2003, 53: 777-789

[7] Ma R Y. Multiplicity of Positive Solutions for a Second-order Three-point Boundary Value Problems. *Comput. Math. Appl.*, 2000, 4(
     193-204

[8] Liu B. Positive Solutions of a Nonlinear Three-point Boundary Value Problems. *Computers Math. Appl.*, 2002, 44: 201-211

[9] Anderson D R. Solutions to Second-order Three-point Problems on Time Scales. *Journal of Difference Equations and Applications*,
     2002, 8: 673-688

[10] Du Z J, Xue C Y, Ge W G. Multiple Solutions for Three-point Boundary Value Problem with Nonlinear Terms Depending on the First
     Order Derivative. *Arch. Math.*, 2005(84): 341-349

[11] Grossinho M D R, Minh膠 F M. Existence Result for Some Third Order Separated Boundary Value Problems. *Nonlinear Anal. TMA*, 2(
     47: 2407-2418

[1] 赵书芬, 张建元. 时滞脉冲抛物型微分方程解的存在性及其在种群动力学中的应用[J]. 应用数学学报, 2011, 34(6): 1068-1081.

[2] 夏静, 余志先, 袁荣. 一类具有非局部扩散的时滞Lotka-Volterra竞争模型的行波解[J]. 应用数学学报, 2011, 34(6): 1082-1093.

[3] 栾世霞, 赵艳玲. 带P-Laplacian 算子的四点四阶奇异边值问题的对称正解[J]. 应用数学学报, 2011, 34(5): 801-812.

[4] 张红侠, 刘立山, 郝新安. 具有积分边界条件的四阶奇异特征值问题的正解[J]. 应用数学学报, 2011, 34(5): 873-885.

[5] 张兴秋. 奇异四阶积分边值问题正解的存在唯一性[J]. 应用数学学报, 2010, 33(1): 38-50.

[6] 廉立芳, 葛渭高. 共振情况下m点p-Laplacian算子边值问题解的存在性[J]. 应用数学学报, 2005, 28(2): 288-295.

[7] Feng Qin ZHANG, Zhi En MA, Ju Rang YAN. 一阶带参数的时滞微分方程的边值问题[J]. 应用数学学报, 2003, 26(3): 525-532.

[8] 钟金标, 陈祖墀. 一类拟线性方程组的可解性[J]. 应用数学学报, 2003, 26(3): 420-426.

[9] 程建纲. 二阶微分方程边值问题的多重正解[J]. 应用数学学报, 2003, 26(2): 272-279.