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二阶奇异微分方程无穷边值问题

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Multiple Positive Solutions of Infinite Boundary Value Problem for Second-order Singular Differential Equations

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- 摘要
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摘要 本文通过构造一个特殊的锥, 利用锥上的不动点指数原理和Krasnosel'skii不动点定理讨论了一类二阶奇异微分方程无穷边值问题正解及多重正解的存在性. 本文结果包含、推广并改进了许多已知的结果.

关键词: 无穷边值问题 二阶奇异微分方程 多重正解 不动点 锥

Abstract: In this paper, by using the fixed point principle and the Krasnosel' skii fixed point theorem, the authors discuss the existence of positive and multiple positive solutions for the singular differential equations of infinite boundary value problems in a special cone. The results significantly extend and improve many known results even for non-singular cases.

Key words: infinite boundary value problem second-order singular differential equation multiple positive solutions fixed point cone

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[1] Liu B M, Liu L S, Wu Y H. Multiple Solutions of Singular Three-point Boundary Value Problems on [0,+∞). Nonlinear Anal, 2009, 70 3348-3357

[2] 邢美红, 张克梅, 高合理. 半无穷区间广义Sturm-Liouville 边值问题的多个正解存在性. 数学物理学报, 2009, 29A(4): 929-939 (Xing M H, Zhan M, Gao H L. Existence of Positive Solutions for General Sturm-Liouville Bound- ary Value Problems. Acta Mathematica Scientia, 20 29A(4): 929-939)

[3] Ma R Y, Zhu B. Existence of Positive Solutions for a Semipositone Boundary Value Problem on the Half-line. Comput. Math. Appl., 2009, 58: 1672-1686

[4] Kang P,Wei Z L. Multiple Positive Solutions of Multi-point Boundary Value Problems on the Half-line. Appl. Math. Comput, 2008, 19 (1): 402-415

[5] Liu Y S. Existence and Unboundedness of Positive Solutions for Singular Boundary Value Problems on Half-line. Appl. Math. Compu 2003, 144: 543-556

[6] Djebali S, Mebarki K. Multiple Positive Solutions for Singular BVPs on the Positive Half-line. Comput Math Appl, 2008, 55: 2940-29

[7] Djebali S, Mebarki K. Existence Results for a Class of BVPs on the Positive Half-line. Comm. Appl. Nonlinear Anal., 2007, 14: 13-31

[8] Tian Y, Ge W G. Positive Solutions for Multi-point Boundary Value Problem on the Half-line. J. Math. Anal. Appl., 2007, 325: 1339-1349

[9] Meehan M, O'Regan D. Existence Theory for Equations on the Half-line. Nonlinear Anal., 1999, 35: 355-387

[10] O'Regan D, Yan B Q, Agarwal R P. Solutions in Weighted Spaces of Singular Boundary Value Problems on the Half-line. J. Compu Appl. Math., 2007, 205: 751-763

[11] Yan B Q, O'Regan D, Agarwal R P. Unbounded Solutions for Singular Boundary Value Problems on the Semi-infinite Interval: Uppe and Lower Solutions and Multiplicity. J. Comput. Appl. Math., 2006, 197: 365-386

[12] Zhang X G, Liu L S, Wu Y H. Existence of Positive Solutions for Second-order Semipositone Differ- ential Equations on the Half-lir Appl. Math. Comput., 2007, 185: 628-635

[13] Zima M. On Positive Solutions of Boundary Value Problems on the Half-line. J. Math. Anal. Appl., 2001, 259: 127-136

[14] Hao Z C, Liang J, Xiao T J. Positive Solutions of Operator Equations on Half-line. J. Math. Anal. Appl., 2006, 314: 423-435

[15] Lian H R, Ge W G. Existence of Positive for Sturm-Liouville Boundary Value Problems on the Half-line. J. Math. Anal. Appl, 2006, 3 781-792

[16] 郝兆才, 毛安民. 一类奇异二阶边值问题正解存在的充分必要条件. 系统科学与数学, 2001, 21(1): 93-100 (Hao Z C, Mao A M. A Necessary ar Sufficient Condition for the Existence of Positive Solutions to a Class of Singular Second-order boundary value problem. Journal o Systems Science and Mathematical Sciences, 2001, 21(1): 93-100)

[17] Wang Y , Liu L S, Wu Y H. Positive Solutions of Singular Boundary Value Problems on the Half-line. Appl. Math. Comput., 2008, 19 789-796

[18] Liu L S, Wang Z G, Wu Y H. Multiple Positive Solutions of the Singular Boundary Value Problems for Second-order Differential Equations on the Half-line. Nonlinear Anal., 2009, 71: 2564-2575

[19] Agarwal R P, O'Regan D. Theory of Singular Boundary Value Problem. Singapore: World Science, 1994

[20] Guo D J, Lakshmikantham V. Nonlinear Problems in Abstract Cones. New York: Academic Press, 1988

[1] 崔玉军, 孙经先. Banach空间中二阶微分方程三点边值问题的正解[J]. 应用数学学报, 2011, 34(4): 743-751.

[2] 彭定涛. 非紧集上不连续函数的Ky Fan不等式及其等价形式和应用[J]. 应用数学学报, 2011, 34(3): 526-536.

[3] 黄龙光. 一类积集上的广义向量变分不等式[J]. 应用数学学报, 2011, 34(2): 254-264.

[4] 张亚琴. 自反Banach空间中向量优化问题弱有效解集特性的进一步研究[J]. 应用数学学报, 2011, 34(1): 102-112.

[5] 黄龙光. 一类积集上的广义向量变分不等式[J]. 应用数学学报, 2011, 34(1): 254-264.

[6] 闫东明. 一类四阶两点边值问题正解的存在性[J]. 应用数学学报, 2010, 33(6): 1113-1122.

[7] 唐古生, 刘金旺. 几乎凸多值映射的逼近选择及对平衡存在性与不动点定理的应用[J]. 应用数学学报, 2010, 33(6): 1133-1141.