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四阶奇异边值问题的正解

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摘要 研究了一类四阶奇异边值问题$$\left\{\ay\begin{array}{lll}
&&u^{(4)}(t)=a(t)f(t,u(t),u''(t))+b(t)g(t,u(t),u''(t)),\q 0<t<1,\\[3mm]
&&u(0)=u(1)=0,\\[3mm]
&&\alpha u''(0)-\beta u'''(0)=0,\q \gamma u''(1)+\delta u'''(1)=0
\end{array}\right.$$正解的存在性,在f和g满足比超线性和次线性条件更广泛的极限条件下,利用锥压缩和拉伸不动点定理获得了正解的存在性结果,推广和包含了一些已知结果.

关键词 奇异边值问题,锥,正解.

分类号 34B15, 34B25

Positive Solutions of Fourth Order Singular Boundary Value Problems

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Abstract This paper is concerned with the existence of positive solutions for a class of fourth order singular boundary value problems:$$\left\{\aligned &u^{(4)}(t)=a(t)f(t,u(t),u''(t))+b(t)g(t,u(t),u''(t)),\q 0<t<1,\\
&u(0)=u(1)=0,\\
&\alpha u''(0)-\beta u'''(0)=0,\q \gamma u''(1)+\delta u'''(1)=0.
\endaligned\right.$$
The existence of positive solutions is obtained by employing the fixed-point theorem of cone expansion and compression type under the condition that f and g satisfy the limit condition which is more extensive than the existing superlinear and sublinear condition. The obtained results generalize and include some known results.

Key words Singular boundary value problem cone positive solutions.

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