论文

一类带p-Laplace型算子的高阶两点边值问题的极值解

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Extremal Solutions for a Higher Order Two Point Boundary Value Problem with p-Laplacian-like Operator

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- 摘要
- 参考文献
- 相关文章

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摘要 本文主要研究一类带p-Laplace型算子的n ($\geqslant 3$)阶非线性常微分方程 $-[\varphi(u^{(n-1)}(t))]'=f(t,u(t))$, a.e. $t\in[a,b]$ 满足两点边界条件 $u^{(i)}(a)=A_i$, i=0,1,$\cdots$,n-3, $u^{(n-1)}(a)=A$, $u^{(n-1)}(b)=B$ 的边值问题极值解的存在性, 这里φ: $R \to R$=(-∞,+∞)是递增的同胚, f: $[a,b] \times R \to R$ 是L^1-Carathéodory函数, $A,B,A_i,B_i\in R$, i=0,1,$\cdots$,n-3. 主要利用基于反极大值原理的单调迭代方法, 得到了上述边值问题极值解的存在性结果.

关键词: 边值问题 p-Laplace型算子   单调迭代方法   极值解

Abstract: In this paper, we will consider the existence of extremal solutions for a nth-order differential equation with p-Laplacian-like operator $-[\varphi(u^{(n-1)}(t))]'=f(t,u(t))$, a.e. $t\in[a,b]$ subject to the following two-point boundary conditions $u^{(i)}(a)=A_i$, i=0,1,$\cdots$,n-3, $u^{(n-1)}(a)=A$, $u^{(n-1)}(b)=B$, where φ: $R \to R$=(-∞,+∞) is an increasing homeomorphism, f: $[a,b] \times R \to R$ is L^1-Carathéodory function, and $A,B,A_i,B_i\in R$, i=0,1,$\cdots$,n-3. The existence result of extremal solutions for the problem is obtained via monotone iterative techniques which are based on anti-maximum principles.

Key words: boundary value problem p-Laplacian-like operator   monotone iterative technique   extremal solution

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