

Du, Zengji; Lin, Xiaojie; Ge, Weigao

Some higher-order multi-point boundary value problem at resonance. (English)

Zbl 1059.34010

J. Comput. Appl. Math. 177, No. 1, 55-65 (2005).

Summary: This paper deals with the existence of solutions for the following n th-order multi-point boundary value problem at resonance

$$\begin{aligned}x^{(n)}(t) &= f(t, x(t), x'(t), \dots, x^{(n-1)}(t)) + e(t), \quad t \in (0, 1), \\x(0) &= \sum_{i=1}^{m-2} \alpha_i x(\xi_i), \quad x'(0) = \dots = x^{(n-2)}(0) = 0, \quad x(1) = x(\eta),\end{aligned}$$

where $f : [0, 1] \times \mathbb{R}^n \rightarrow \mathbb{R}$ is a continuous function, $e \in L^1[0, 1]$, $\alpha_i \in \mathbb{R}$, $1 \leq i \leq m - 2$, $0 < \xi_1 < \xi_2 < \dots < \xi_{m-2} < 1$ and $0 < \eta < 1$. An existence theorem is obtained by using the coincidence degree theory of Mawhin.

MSC:

34B10 Nonlocal and multipoint boundary value problems for ordinary differential equations

Cited in 30 Documents

Keywords:

Multipoint boundary value problem; Resonance; Fredholm operators; Coincidence degree theory

Full Text: DOI

References:

- [1] Du, Z.; Ge, W.; Lin, X., Existence of solution for a class of third order nonlinear boundary value problems, J. math. anal. appl., 294, 104-112, (2004) · Zbl 1053.34017
- [2] Feng, W.; Webb, J.R.L., Solvability of m -point boundary value problems with nonlinear growth, J. math. anal. appl., 212, 467-480, (1997) · Zbl 0883.34020
- [3] Feng, W.; Webb, J.R.L., Solvability of three-point boundary value problems at resonance, Nonlinear anal. theory meth. appl., 30, 3227-3238, (1997) · Zbl 0891.34019
- [4] Gupta, C.P., On a third-order boundary value problem at resonance, Differential integral equations, 2, 1-12, (1989) · Zbl 0722.34014
- [5] Gupta, C.P., Solvability of multi-point boundary value problems at resonance, Results math., 28, 270-276, (1995) · Zbl 0843.34023
- [6] Gupta, C.P., A second order m -point boundary value problem at resonance, Nonlinear anal. theory meth. appl., 24, 1483-1489, (1995) · Zbl 0824.34023
- [7] Gupta, C.P., Existence theorems for a second order m -point boundary value problem at resonance, Int. J. math. sci., 18, 705-710, (1995) · Zbl 0839.34027
- [8] Liu, B., Solvability of multi-point boundary value problem at resonance (II), Appl. math. comput., 136, 353-377, (2003) · Zbl 1053.34016
- [9] Ma, R.Y., Multiplicity results for a third order value problem at resonance, Nonlinear anal. theory meth. appl., 32, 493-499, (1998) · Zbl 0932.34014
- [10] J. Mawhin, Topological degree methods in nonlinear boundary value problems, in: NSFCBMS Regional Conference Series in Mathematics, American Mathematical Society, Providence, RI, 1979. · Zbl 0414.34025
- [11] Nagle, R.K.; Pothoven, K.L., On a third-order nonlinear boundary value problems at resonance, J. math. anal. appl., 195, 148-159, (1995) · Zbl 0847.34026
- [12] Prezeradzki, B.; Stańczy, R., Solvability of a multi-point boundary value problem at resonance, J. math. anal. appl., 264, 253-261, (2001) · Zbl 1043.34016
- [13] Wong, F.H., An application of Schauder's fixed point theorem with respect to higher order BVPs, Proc. amer. math. soc., 126, 2389-2397, (1998) · Zbl 0895.34016

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.