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PII: S0893-9659(18)30256-8
DOI: https://doi.org/10.1016/j.aml.2018.07.032
Reference: AML 5604

To appear in: *Applied Mathematics Letters*

Received date : 4 June 2018
Revised date : 24 July 2018
Accepted date : 24 July 2018

Please cite this article as: Y. Wei, Q. Song, Z. Bai, Existence and iterative method for some fourth order nonlinear boundary value problems, Appl. Math. Lett. (2018), https://doi.org/10.1016/j.aml.2018.07.032

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Existence and iterative method for some fourth order nonlinear boundary value problems☆

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Abstract

This work is devoted to proving the existence of the iterative solution to a fourth order boundary value problem. By the use of a novel efficient method for nonlinear fourth order boundary value problem, the existence and uniqueness of solution for the problem is obtained. The monotony of iterations is also considered. Some examples are presented to illustrate the main results.

Keywords: fourth order equation; existence and uniqueness; iterative method.
2010 MSC: 34B15, 34B18.

1. Introduction

Fourth-order two-point boundary value problems have been considered by many researchers [1-17]. In [1], Bai considered the following problem:

$$u^{(4)}(t) = f(t, u(t), u''(t)), \quad t \in (0, 1), \tag{1.1}$$

$$u(0) = u(1) = u''(0) = u''(1) = 0, \tag{1.2}$$

where $f : [0, 1] \times \mathbb{R}^2 \to \mathbb{R}$ is continuous. Using a new maximum principle of fourth-order equation and some restrictive conditions, the existence results

☆This work is supported by NSFC (11571207), ZR2018MA011, the Taishan Scholar project, and SDUST graduate innovation project SDKDYC170343.

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