Title: Positive solutions of fourth order problems with clamped beam boundary conditions

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Source: Nonlinear Analysis-Theory Methods & Applications

Volume: 74 Issue: 10 Pages: 3112-3122 DOI: 10.1016/j.na.2011.01.027 Published: Jul 2011

Document Type: Article

Language: English

**Abstract:** In this paper we make an exhaustive study of the fourth order linear operator u((4)) + M u coupled with the clamped beam conditions u(0) = u(1) = u'(0) = u'(1) = 0. We obtain the exact values on the real parameter M for which this operator satisfies an anti-maximum principle. Such a property is equivalent to the fact that the related Green's function is nonnegative in  $[0, 1] \times [0, 1]$ . When M < 0 we obtain the best estimate by means of the spectral theory and for M > 0 we attain the optimal value by studying the oscillation properties of the solutions of the homogeneous equation u((4)) + M u = 0. By using the method of lower and upper solutions we deduce the existence of solutions for nonlinear problems coupled with this boundary conditions. (C) 2011 Elsevier Ltd. All rights reserved.

Author Keywords: Clamped Beam; Fourth Order Boundary Value Problem; Maximum Principles; Lower and Upper Solutions

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Funding:

Funding Agency	Grant Number
Ministerio de Educacion y Ciencia, Spain	MTM2010-15314

**Publisher:** Pergamon-Elsevier Science LTD **Publisher Address:** The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, England

ISSN: 0362-546X

**Citation:** CABADA, Alberto; ENGUIÇA, Ricardo Roque - Positive solutions of fourth order problems with clamped beam boundary conditions. <u>Nonlinear Analysis-Theory Methods & Applications</u>. ISSN 0362-546X. Vol. 74, n.º 10 (2011) p. 3112-3122.