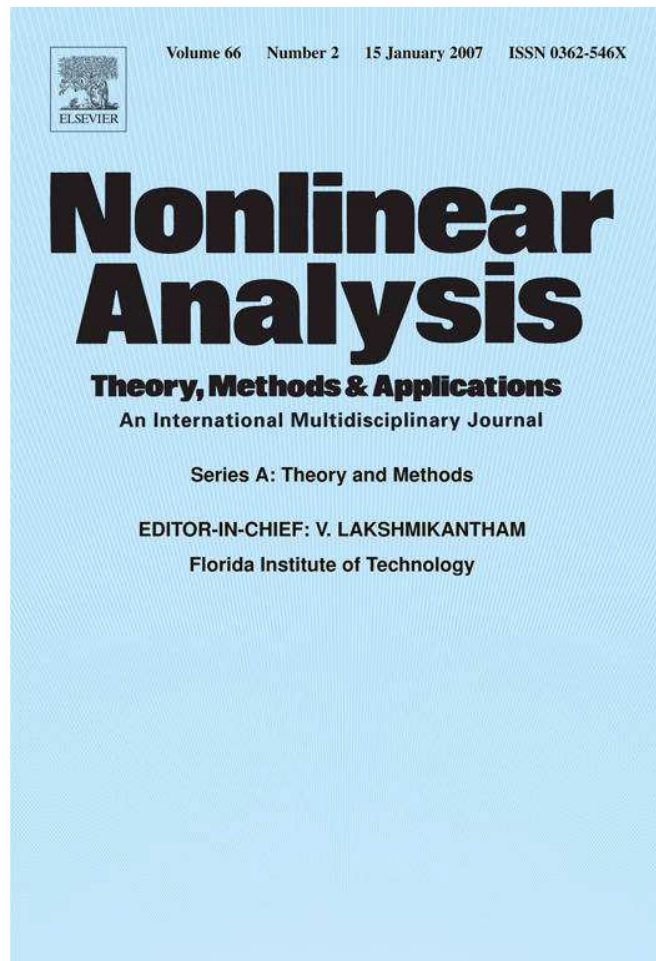


Provided for non-commercial research and educational use only.
Not for reproduction or distribution or commercial use.



This article was originally published in a journal published by Elsevier, and the attached copy is provided by Elsevier for the author's benefit and for the benefit of the author's institution, for non-commercial research and educational use including without limitation use in instruction at your institution, sending it to specific colleagues that you know, and providing a copy to your institution's administrator.

All other uses, reproduction and distribution, including without limitation commercial reprints, selling or licensing copies or access, or posting on open internet sites, your personal or institution's website or repository, are prohibited. For exceptions, permission may be sought for such use through Elsevier's permissions site at:

<http://www.elsevier.com/locate/permissionusematerial>



ELSEVIER

Available online at www.sciencedirect.com



ScienceDirect

Nonlinear Analysis 66 (2007) 527–535

**Nonlinear
Analysis**

www.elsevier.com/locate/na

On a periodic boundary value problem for third order linear functional differential equations

S. Mukhigulashvili

Mathematical Institute, Academy of Sciences of the Czech Republic, Žitkova 22, 616 62 Brno, Czech Republic

Received 1 October 2005; accepted 30 November 2005

Abstract

Unimprovable sufficient conditions are established for the unique solvability of the periodic problem

$$u'''(t) = \sum_{i=0}^2 \ell_i(u^{(i)})(t) + q(t), \quad u^{(j)}(0) = u^{(j)}(\omega) + c_j \quad (j = \overline{0, 2}),$$

where $\ell_j : C([0, \omega]) \rightarrow L([0, \omega])$ are the linear bounded operators, $q \in L([0, \omega])$ and $c_j \in R$.
© 2005 Elsevier Ltd. All rights reserved.

MSC: 34K06; 34K10

Keywords: Linear functional differential equation; Periodic boundary value problem; Existence and uniqueness

1. Statement of problem and formulation of main results

Consider the problem of the existence and uniqueness of the solution of the equation

$$u'''(t) = \sum_{i=0}^2 \ell_i(u^{(i)})(t) + q(t) \quad \text{for } t \in [0, \omega] \quad (1.1)$$

satisfying the periodic boundary conditions

$$u^{(j)}(0) = u^{(j)}(\omega) + c_j \quad (j = \overline{0, 2}), \quad (1.2)$$

where $\ell_j : C([0, \omega]) \rightarrow L([0, \omega])$ are the linear bounded operators, $q \in L([0, \omega])$, $\omega > 0$, and $c_j \in R$.

E-mail address: mukhig@ipm.cz.

0362-546X/\$ - see front matter © 2005 Elsevier Ltd. All rights reserved.
doi:10.1016/j.na.2005.11.046