

On the Existence of One-Signed Periodic Solutions of Some Differential Equations of Second Order

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Abstract

We study the existence of one-signed periodic solutions of the equations

$$\begin{aligned}x''(t) - a^2(t)x(t) + \mu f(t, x(t), x'(t)) &= 0, \\x''(t) + a^2(t)x(t) &= \mu f(t, x(t), x'(t)),\end{aligned}$$

where $\mu > 0$, $a : (-\infty, +\infty) \rightarrow (0, \infty)$ is continuous and 1-periodic, f is a continuous and 1-periodic in the first variable and may take values of different signs. The Krasnosielski fixed point theorem on cone is used.

Key words: Positive solutions; boundary value problems; cone; fixed point theorem.

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1 Introduction

Nonnegative solutions to various boundary value problems for ordinary differential equations have been considered by several authors (see for instance in