Existence result for a third-order ODE with nonlinear boundary conditions in presence of a sign-type Nagumo control. (English summary)


The authors, of the paper under review, consider the third order nonlinear differential equation

$$u'''(t) = f(t, u(t), u'(t), u''(t)),$$

where $f: [a, b] \times \mathbb{R}^3 \to \mathbb{R}$ is a continuous function, and the following two types of boundary conditions:

$$u(a) = A, \quad \varphi(u'(b), u''(b)) = 0, \quad u''(a) = B,$$

or

$$u(a) = A, \quad \psi(u'(a), u''(a)) = 0, \quad u''(b) = C,$$

with $\varphi, \psi: \mathbb{R}^2 \to \mathbb{R}$ continuous functions, satisfying a monotonicity condition in the second variable, and $A, B, C \in \mathbb{R}$. A sign-type Nagumo condition is assumed on $f$, which allows an asymmetric unbounded behavior on the nonlinearity. An existence result is obtained by means of a Leray-Schauder degree argument and by a lower and upper solutions technique.

Reviewed by Maria Patrizia Pera

References


6. Z. Du, W. Ge, X. Lin, Existence of solutions for a class of third-order nonlinear boundary value

Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

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