Generalized Monotone Iterative Technique for Functional Differential Equations with Retardation and Anticipation

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Abstract: The method of monotone iterative technique together with coupled lower and upper solutions is employed to prove the existence of coupled extremal solutions when the forcing function is the sum of an increasing and decreasing functions. This is referred to as generalized monotone method. This will include the usual monotone method results as special cases. Further using uniqueness condition uniqueness results for functional differential equations involving retardation and anticipation are also established.

Keywords: Generalized monotone method, equations with retardation and anticipation.

Mathematics Subject Classification (2000): 34C12, 34K05, 34K99.

1 Introduction

Qualitative and quantitative study of the functional differential equations with retardation and anticipation has very useful applications. Such dynamic systems occur in chaotic epidemic model and financial models, specifically stock exchange models. A typical model that arises is of the form

\[ x'(t) = F(t, x(t), y(t + \tau)) - ax(t), \]
\[ y'(t) = G(x(t - \tau) - by(t). \]

(1)

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