

## MONOTONE ITERATIVE TECHNIQUE FOR PERIODIC BOUNDARY VALUE PROBLEM OF SET DIFFERENTIAL EQUATIONS INVOLVING CAUSAL OPERATORS

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**Abstract.** In this paper we obtain an existence result for periodic boundary value problem(PBVP) for set differential equations involving causal operators. We utilize the iterates developed in establishing monotone iterative technique for initial value problem of set differential equations involving causal operators in this process. We show that these monotone iterates of lower and upper solutions of initial value problems (IVPs) converge uniformly to minimal and maximal solutions of the corresponding PBVP.

**Keywords.** periodic boundary value problem(PBVP) for set differential equations involving causal operators, lower and upper solutions of type-I and II, Uniform convergence, monotone iterates of lower and upper solutions.

## 1 Introduction

A causal operator [1,17] is a non anticipative operator and was first used by Volterra implicitly in his work on integral equations. The study of causal operators is very useful as they unify several dynamic systems such as ordinary differential equations [15], delay differential equations [16], integro differential equations [14], to name a few. It has been observed that set differential equations [18] are generalizations of ordinary differential equations and vector differential equations in a semilinear metric space and are useful in studying multivalued differential inclusions or multivalued differential equations.

A combination of these two areas, the study of set differential equations involving causal operators is a very interesting generalization. Thus set differential equations involving causal operators encompass a variety of problems and the basic theory is given in [8, 9, 10].