A Study of Set Differential Equations With Delay

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Abstract. Existence and global existence results are proved for set differential equations with delay. Also nonuniform practical stability and nonuniform boundedness results have been obtained using Lyapunov functions on product spaces.

This paper is written in honor of Professor Siljak's 70th birthday.

1 Introduction

Recently, the study of set differential equations has attracted much attention, [1, 2, 3, 4, 5, 6, 7, 12, 13, 14, 16, 17] as an independent area because of its inherent advantages. Also, the differential equations with delay are better models for physical phenomena as there is a time lag between the cause and the effect. The method of Lyapunov functions on product spaces was initiated in [11, 15] so as to appropriately study these differential equations.

In this paper, we study set differential equations with delay and obtain existence results. Further, as the diameter of solutions of set differential equations is nondecreasing as time increases, we study the nonuniform practical stability and nonuniform boundedness results. See [8, 10] for other related results.

2 Preliminaries

We start with the necessary preliminaries required to define a set differential equation.

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