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UNIFORM CONTROLLABILITY FOR A CLASS OF IMPULSIVE TIME-VARYING SYSTEMS

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Abstract. This paper investigates the controllability of a class of time-varying impulsive systems. A simple criteria for controllability to a class of linear time-varying impulsive systems is established.

Keywords. Linear systems, time-varying systems, controllability, impulsive systems, fixed point theorem.

AMS (MOS) subject classification: 82D10, 76X05.

1 Introduction

The controllability and observability for linear time-varying systems have been investigated for a long time. The relations between the stability and the controllability had been studied in papers [1, 2]. G. Kern [3] gave an easy applicable criteria for the controllability and the uniform complete controllability. That is to conclude the controllability for time-varying systems by means of the controllability of "constants coefficients" systems . In this paper, we appeal to get a similar results for linear impulsive time-varying systems.

Many dynamical system with impulsive dynamical behaviors have been investigated extensively, because their widely applications in physics, chemistry, biology and engineering etc. In papers [4, 5, 6], the authors investigated the controllability and the observability of impulsive dynamical systems. We note that in applications of these results, the calculation of the transition matrix is needed, and this causes the difficult in deciding the conditions of controllability to the impulsive dynamical systems. We are motivated by the methods of G. Kern in paper [3], G. Kern investigated the problems of stabilizing "controllable" linear time-varying systems. He considered the following finite dimensional linear time-varying system,

$$x'(t) = A(t)x(t) + B(t)u(t), \quad t \in J = [t_0, +\infty), \tag{1}$$