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ON FIRST AND SECOND-ORDER PERTURBED DIFFERENTIAL INCLUSIONS GOVERNED BY MAXIMAL MONOTONE OPERATORS

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Abstract. In this paper we establish, in a separable Hilbert space, a result asserting the existence of absolutely continuous solutions for a system made up of a first-order differential inclusion governed by time and state-dependent maximal monotone operators; and an ordinary differential equation. From this result, we derive existence of absolutely continuous solutions to a second-order differential inclusion governed by time and state-dependent maximal monotone operators.

1. Introduction

Let us consider the following system

$$(S_f, g) \qquad \begin{cases} -\dot{v}(t) \in A(t,u(t))v(t) + F(t,u(t),v(t)) & \text{for a.e. } t \in [0,T], \\ v(t) \in D(A(t,u(t))) & \text{for all } t \in [0,T], \\ \dot{u}(t) = g(t,u(t),v(t)) & \text{for a.e. } t \in [0,T], \\ u(0) = u_0, \quad v(0) = v_0 \in D(A(0,u_0)), \end{cases}$$

where for each $(t,x) \in [0,T] \times H$, $A(t,x)$ is a time and state-dependent maximal monotone operator (mmop), $D(A(t,x))$ stands for its domain, which depends

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