Ann. Acad. Rom. Sci.
Ser. Math. Appl.
ISSN 2066 - 6594 Vol. 4, No. 2 / 2012

A TOPOLOGICAL PROPERTY OF THE SOLUTION SET OF A SECOND-ORDER DIFFERENTIAL INCLUSION*

Aurelian Cernea†

Abstract

We consider a Cauchy problem for a Sturm-Liouville type differential inclusion involving a nonconvex set-valued map and we prove that the set of selections corresponding to the solutions of the problem considered is a retract of the space of integrable functions on unbounded interval.

MSC: 34A60

keywords: differential inclusion, decomposable set, retract.

1 Introduction

In this paper we study second-order differential inclusions of the form

$$(p(t)x'(t))' \in F(t, x(t)) \quad a.e.\ [0, \infty), \quad x(0) = x_0, \quad x'(0) = x_1, \qquad (1.1)$$

where $F : [0, \infty) \times \mathbf{R}^n \to \mathcal{P}(\mathbf{R}^n)$ is a set-valued map, $x_0, x_1 \in \mathbf{R}^n$ and $p(.) : [0, \infty) \to (0, \infty)$ is continuous.

*Accepted for publication on May 17, 2012.

†acernea@fmi.unibuc.ro Faculty of Mathematics and Informatics, University of Bucharest, Academiei 14, 010014 Bucharest, Romania