MATHEMATICA, Tome 54 (77), N° 1, 2012, pp. 3–10

DERIVED CONES TO REACHABLE SETS OF STURM-LIOUVILLE TYPE DIFFERENTIAL INCLUSIONS

AURELIAN CERNEA

Abstract. We consider a second-order differential inclusion and we prove that the reachable set of a certain second-order variational inclusion is a derived cone in the sense of Hestenes to the reachable set of the initial differential inclusion. This result allows to obtain a sufficient condition for local controllability along a reference trajectory.

MSC 2010. 34A60, 93C15.

Key words. Derived cone, differential inclusions, local controllability.

REFERENCES

[1] Aubin, J.P. and Frankowska, H., *Set-valued Analysis*, Birkhäuser, Basel, 1990.

[2] Cernea, A., *Local controllability of hyperbolic differential inclusions via derived cones*, Rev. Roumaine Math. Pures Appl., **47** (2002), 21–31.

[3] Cernea, A., *Derived cones to reachable sets of differential-difference inclusions*, Nonlinear Anal. Forum, **11** (2006), 1–13.

[4] Cernea, A., *Derived cones to reachable sets of discrete inclusions*, Nonlinear Stud., **14** (2007), 177–187.

[5] Cernea, A., *Continuous version of Filippov's theorem for a Sturm-Liouville type differential inclusion*, Electronic J. Differential Equations, **2008** (2008), 1–7.

[6] Cernea, A., *A Filippov type existence theorem for a class of second-order differential inclusions*, J. Inequal. Pure Appl. Math., **9** (2008), 1–6.

[7] Cernea, A., *Sturm-Liouville type differential inclusions in non separable Banach spaces*, Math. Reports, **10 (60)** (2008), 205–211.

[8] Cernea, A., *On the solution set of a nonconvex nonclosed Sturm-Liouville type differential inclusion*, Commentationes Math., **49** (2009), 139–146.

[9] Cernea, A., *Variational inclusions for a Sturm-Liouville type differential inclusion*, Math. Bohem., **135** (2010), 171–178.

[10] Cernea, A. and Mirică, Ş., *Derived cones to reachable sets of differential inclusions*, Mathematica, **40 (63)** (1998), 35–62.

[11] Chang, Y.K. and Li, W.T., *Existence results for second order impulsive functional differential inclusions*, J. Math. Anal. Appl., **301** (2005), 477–490.

[12] Hestenes, M.R., *Calculus of Variations and Optimal Control Theory*, Wiley, New York, 1966.

[13] Mirică, Ş., *New proof and some generalizations of the Minimum Principle in optimal control*, J. Optim. Theory Appl., **74** (1992), 487–508.

[14] Mirică, Ş., *Intersection properties of tangent cones and generalized multiplier rules*, Optimization, **46** (1999), 135–163.

Received January 13, 2011
Accepted February 3, 2011

University of Bucharest
Faculty of Mathematics and Informatics
010014 Bucharest, Romania
E-mail: `acernea@fmi.unibuc.ro`