## MATHEMATICA, Tome 47 (70), N° 1, 2005, pp. 39–48

# SOME REMARKS ON DIFFERENTIAL INCLUSIONS WITH STATE CONSTRAINTS

### AURELIAN CERNEA

**Abstract.** We prove the existence of solutions to lipschitzean integrodifferential inclusions viable in a closed set contained in  $\mathbb{R}^n$ . Using this result we study the infinitesimal properties of functions which are nonincreasing along all the trajectories of a differential inclusion.

#### MSC 2000. 34A60.

**Key words.** Lipschitzean set-valued maps, differential inclusions, viable solutions, generalized derivatives.

### REFERENCES

- [1] AUBIN, J.P. and CELLINA, A., Differential Inclusions, Springer, Berlin, 1984.
- [2] BACCIOTTI, A., CERAGIOLI, F. and MAZZI, L., Differential inclusions and monotonicity conditions for nonsmooth Lyapunov functions, Set-Valued Anal., 8 (2000), 299–309.
- [3] CELLINA, A. and STAICU, V., Well posedness for differential inclusions on closed sets, J. Differential Equations., 92 (1991), 2–13.
- [4] CERNEA, A. and MIRICĂ, ŞT., A note on nonsmooth Lyapunov functions for state constrained differential inclusions, Math. Rep. (Bucur.), 5(55) (2003), 283–292.
- [5] CLARKE, F.H., LEDYAEV, YU., YU, S., STERN, R.J. and WOLENSKI, P.R., Nonsmooth Analysis and Control Theory, Springer, New York, 1998.
- [6] FILIPPOV, A.F., Classical solutions of differential equations with multi-valued right-hand side, SIAM J. Control, 5 (1967), 609–621.
- [7] FRANKOWSKA, H., Optimal trajectories associated with a solution of the contingent Hamilton-Jacobi equation, Appl. Math. Optim., 19 (1989), 291–311.
- [8] GONCHAROV, V.V., Some properties of viability problems depending on a parameter, Nonlinear Differential Equations Appl., 2 (1995), 1–19.
- KANNAI, Z. and TALLOS, P., Viable trajectories of nonconvex differential inclusions, Nonlinear Anal., 18 (1992), 295–306.
- [10] MIRICĂ, ŞT., Invariance and monotonicity for autonomus differential inclusions, Stud. Cerc. Mat., 47 (1995), 179–204.

Received September 22, 2003

University of Bucharest Faculty of Mathematics and Informatics Str. Academiei 14 010014 Bucharest, Romania E-mail: acernea@math.math.unibuc.ro