Discussiones Mathematicae
Differential Inclusions, Control and Optimization 32 (2012) 63–64
doi:10.7151/dmdico.1139

ON FUNCTIONAL DIFFERENTIAL INCLUSIONS IN HILBERT SPACES

Myelkebir Aitalioubrahim

University Sultan My Slimane
Faculty polydisciplinary, BP 592, Mghila
Beni Mellal, Morocco

e-mail: aitalifr@hotmail.com

Abstract

We prove the existence of monotone solutions, of the functional differential inclusion $\dot{x}(t) \in f(t, T(t)x) + F(T(t)x)$ in a Hilbert space, where f is a Carathéodory single-valued mapping and F is an upper semicontinuous set-valued mapping with compact values contained in the Clarke subdifferential $\partial_c V(x)$ of a uniformly regular function V.

Keywords: functional differential inclusion, regularity, Clarke subdifferential.

2010 Mathematics Subject Classification: 34A60, 34K05, 34K25.

References

[1] M. Aitalioubrahim and S. Sajid, *viability problem with perturbation in Hilbert space*, Electron. J. Qual. Theory Differ. Equ. **7** (2007) 1–14.

[2] J.P. Aubin and A. Cellina, Differential Inclusions, Springer-Verlag, Berlin, 1984. doi:10.1007/978-3-642-69512-4

[3] M. Bounkhel, *Existence results of nonconvex differential inclusions*, Portugal. Math. **59** (3) (2002) 283–310.

[4] A. Bressan, A. Cellina and G. Colombo, *Upper semicontinuous differential inclusions without convexity*, Proc. Amer. Math. Soc. **106** (1989) 771–775. doi:10.1090/S0002-9939-1989-0969314-6

[5] A. Cernea and V. Lupulescu, *Viable solutions for a class of nonconvex functional differential inclusions,* Math. Reports **7(57)** (2) (2005) 91–103.

[6] F.H. Clarke, Optimization and Nonsmooth Analysis, Wiley and Sons, 1983.

[7] F.H. Clarke, Yu.S. Ledyaev, R.J. Stern and P.R. Wolenski, Nonsmooth Analysis and Control Theory, Springer, New York, 1998.

[8] K. Deimling, Multivalued Defferential Equations. De Gruyter Series in Non linear Analysis and Applications, Walter de Gruyter, Berlin, New York, 1992.

[9] A. Gavioli and L. Malaguti, *Viable solutions of differential inclusions with memory in Banach spaces*, Portugal. Math. **57** Fasc. 2 (2000).

[10] G. Haddad, *Monotone trajectories of differential inclusions and functional differential inclusions with memory*, Israel J. Math. **39** (1981) 83–100. doi:10.1007/BF02762855

[11] G. Haddad, *Monotone trajectories for functional differential inclusions*, J. Differential Equations **42** (1981) 1–24. doi:10.1016/0022-0396(81)90031-0

[12] R.T. Rockafellar, *Generalized directional derivatives and subgradients of nonconvex functions*, Canad. J. Math. **39** (1980) 257-280. doi:10.4153/CJM-1980-020-7

[13] A. Syam, Contributions aux Inclusions Différentielles, Ph. thesis, Université Montpellier II, 1993.

Received 3 June 2012