

ON A CLASS OF ABSTRACT FUNCTIONAL DIFFERENTIAL EQUATIONS INVOLVING ALMOST SECTORIAL OPERATORS

EDUARDO HERNÁNDEZ

Abstract. We study the existence of mild solutions for a class of abstract functional differential equations involving almost sectorial operators. A concrete application to delayed partial differential equations is presented.

Mathematics subject classification (2010): 34K30, 35R10, 47D06.

Keywords and phrases: functional differential equations, almost sectorial operator, mild solution, semi-group of growth α .

REFERENCES

- [1] G. DA PRATO, *Semigrupper di crescita n* , Ann. Scuola Norm. Sup. Pisa (3), **20** (1966), 753–782.
- [2] T. DLOTKO, *Semilinear Cauchy problems with almost sectorial operators*, Bull. Pol. Acad. Sci. Math., **55**, 4 (2007), 333–346.
- [3] T. FARIA, W. HUANG AND J. WU, *Smoothness of center manifolds for maps and formal adjoints for semilinear FDEs in general Banach spaces*, SIAM J. Math. Anal., **34**, 1 (2002), 173–203.
- [4] T. FARIA, *Normal forms and Hopf bifurcation for partial differential equations with delays*, Trans. Amer. Math. Soc., **352**, 5 (2000), 2217–2238.
- [5] H. HENRÍQUEZ, *Periodic solutions of quasi-linear partial functional-differential equations with unbounded delay*, Funkcial. Ekvac., **37**, 2 (1994), 329–343.
- [6] Y. HINO, M. YOSHIYUKI, S. MURAKAMI, T. NAITO AND N. VAN MINH, *A variation of constants formula for abstract functional differential equations in the phase space*, J. Differential Equations, **179**, 1 (2002), 336–355.
- [7] A. LUNARDI, *Analytic semigroups and optimal regularity in parabolic problems*, PNLDE Vol. **16**, Birkhäuser Verlag, Basel, 1995.
- [8] N. OKAZAWA, *A generation theorem for semigroups of growth order α* , Tohoku Math. J., **26** (1974), 39–51.
- [9] F. PERIAGO AND B. STRAUB, *A functional calculus for almost sectorial operators and applications to abstract evolution equations*, J. Evol. Equ., **2**, 1 (2002), 41–68.
- [10] F. PERIAGO, *Global existence, uniqueness, and continuous dependence for a semilinear initial value problem*, J. Math. Anal. Appl., **280**, 2 (2003), 413–423.
- [11] J. S. SHIN AND T. NAITO, *Existence and continuous dependence of mild solutions to semilinear functional-differential equations in Banach spaces*, Tohoku Math. J. (2), **51**, 4 (1999), 555–583.
- [12] J. S. SHIN AND T. NAITO, *Semi-Fredholm operators and periodic solutions for linear functional-differential equations*, J. Differential Equations, **153**, 2 (1999), 407–441.
- [13] K. TAIRA, *The theory of semigroups with weak singularity and its applications to partial differential equations*, Tsukuba J. Math., **13**, 2 (1989), 513–562.
- [14] C. C. TRAVIS AND G. F. WEBB, *Existence and stability for partial functional differential equations*, Trans. Amer. Math. Soc., **200** (1974), 395–418.
- [15] J. WU, *Theory and applications of partial functional-differential equations*, Applied Mathematical Sciences **119**, Springer-Verlag, New York, 1996.