Fixed Point Theory, 13(2012), No. 1, 35-48
http://www.math.ubbcluj.ro/~nodeacj/sfptcj.html

GLOBAL EXISTENCE RESULTS FOR A STOCHASTIC DIFFERENTIAL EQUATION IN HILBERT SPACES

YONG-KUI CHANG*, ZHI-HAN ZHAO** AND JUAN J. NIETO***

*Department of Mathematics, Lanzhou Jiaotong University, Lanzhou 730070, P. R. China
E-mail: lzchangyk@163.com

**Institute of Mathematics and Information Engineering, Sanming University
Sanming 365004, P.R. China.
E-mail: zhaozhihan841110@126.com
***Departamento de Análisis Matemático, Facultad de Matemáticas
Universidad de Santiago de Compostela, Santiago de Compostela, 15782, Spain
E-mail: juanjose.nieto.roig@usc.es

Abstract. In this paper, we investigate the existence of mild solutions on the whole real axis for a class of stochastic differential equations in a real separable Hilbert space. By using the Banach contraction mapping principle and the fixed point theorem for condensing maps, some global existence results are obtained under some suitable conditions.
Key Words and Phrases: Stochastic differential equations, Fixed point, Global solutions, Semigroup of linear operators.
2010 Mathematics Subject Classification: 34K14, 60H10, 35B15, 34F05, 47H10.

Acknowledgements. The first author's work was supported by NNSF of China (10901075), Program for New Century Excellent Talents in University (NCET-10-0022), the Key Project of Chinese Ministry of Education (210226), and NSF of Gansu Province of China (1107RJZA091).

References

[1] M. Adimy, K. Ezzinbi, *Strict solutions of nonlinear hyperbolic neutral differential equations*, Appl. Math. Lett., **12**(1999), 107-112.
[2] H. Bao, J. Cao, *Existence and uniqueness of solutions to neutral stochastic functional differential equations with infinite delay*, Appl. Math. Comput., **215**(2010), 1732-1743
[3] J. Bao, Z. Zhou, *Existence of mild solutions to stochastic neutral partial functional differential equations with non-Lipschitz coefficients*, Computer Math. Appl., **59**(2010), 207-214.
[4] T.E. Govindan, *On stochastic delay evolution equations with non-lipschitz nonlinearities in Hilbert spaces*, Differential and Integral Equations, **22**(2009), 157-176.
[5] E. Hernández, H. R. Henríquez, *Existence results for partial neutral functional differential equation with unbounded delay*, J. Math. Anal. Appl., **221**(1998), 452-475.
[6] E. Hernández, H. R. Henríquez, *Existence of periodic solutions of partial neutral functional differential equation with unbounded delay*, J. Math. Anal. Appl., **221**(1998), 499-522.
[7] E. Hernández, *Existence results for partial neutral integro-differential equations with unbounded delay*, J. Math. Anal. Appl., **292**(2004), 194-210.

[8] E. Hernández, S.M. Tanaka Aki, *Global solutions for abstract impulsive differential equations*, Nonlinear Anal., **72**(2010), 1280-1290.
[9] E. Hernández, *Global solutions for abstract neutral differential equations*, Nonlinear Anal., **72**(2010), 2210-2218.
[10] L. Hu, Y. Ren, *Existence results for impulsive neutral stochastic functional integrodifferential equations with infinite delay*, Acta Appl. Math. (2009), doi:10.1007/s10440-009-9546-x
[11] J.A. L ázaro-Camí, J.P. Ortega, *Reduction, reconstruction, and skew-product decomposition of symmetric stochastic differential equations*, Stoch. Dyn., **9**(2009), 1-46.
[12] A. Lin, L. Hu, *Existence results for impulsive neutral stochastic functional integro-differential inclusions with nonlocal initial conditions*, Computer Math. Appl., **58**(2010), 64-73.
[13] A. Lunardi, *Analytic Semigroups and Optimal Regularity in Parabolic Problems*, PNLDE, Vol. 16, Birkhäuser Verlag, Basel, 1995.
[14] J. Luo, T. Taniguchi, *The existence and uniqueness for non-lipschitz stochastic neutral delay evolution equations driven by Possion jumps*, Stoch. Dyn., **9**(2009), 135-152.
[15] R.H. Martin, *Nonlinear Operators and Differential Equations in Banach Spaces*, Robert E. Krieger Publ. Co., Florida, 1987.
[16] A. Pazy, *Semigroups of Linear Operators and Applications to Partial Equations*, Springer-Verlag, New York, 1983.
[17] G. Da Prato, J. Zabczyk, *Stochastic Equations in Infinite Dimensions*, Cambridge University Press, Cambridge, 1992.
[18] Y. Ren, L. Chen, *A note on the neutral stochastic functional differential equations with infinite delay and Possion jumps in an abstract space*, J. Math. Phys., **50**(2009), 082704.
[19] Y. Ren, N. Xia, *Existence, uniqueness and stability of the solutions to neutral stochastic functional differential equations with infinite delay*, Appl. Math. Comput., **210**(2009), 72-79.
[20] B.N. Sadovskii, *On a fixed point principle,* Functional Anal. Appl., **1**(1967), 74-76.
[21] T. Taniguchi, J. Luo, *The existence and asymptotic behaviour of mild solutions to stochastic evolution equations with infnite delay driven by Possion jumps*, Stoch. Dyn., **9**(2009), 217-229.

Received: July, 15, 2010; Accepted: April, 6, 2011.