Dynamics of Continuous, Discrete and Impulsive Systems Series A: Mathematical Analysis 21 (2014) 343-353 Copyright ©2014 Watam Press

http://www.watam.org

GLOBAL ATTRACTING AND QUASI-INVARIANT SETS FOR STOCHASTIC VOLTERRA-LEVIN EQUATIONS WITH JUMPS

D. D. Huan^{1,2} and R. P. Agarwal^{3,4}

¹Institute of Mathematics, School of Mathematical Science, Nanjing Normal University, Nanjing 210023, China

²Faculty of Basic Sciences, Bacgiang Agriculture and Forestry University, Bacgiang, Vietnam Email: diemdanghuan@gmail.com

³Department of Mathematics, Texas A&M University-Kingsville, Kingsville, Texas, 78363, USA

⁴Department of Mathematics, Faculty of Science, King Abdulaziz University, Jeddah, 21589, Saudi Arabia Email: Ravi.Agarwal@tamuk.edu

Abstract. In this paper, based on two new integral inequalities and stochastic analysis techniques, the global attracting and quasi-invariant sets of the solution for stochastic Volterra-Levin equations with Poisson jumps are obtained, respectively. Some well-known results are generalized and improved.

Keywords. Global attracting, Quasi-invariant, Stochastic Volterra-Levin equations, Poisson jumps.

AMS (MOS) subject classification: 34K50, 60H15.

Dynam. Cont. Dis. Ser. A, vol. 21, no. 3-4, pp. 343-353, 2014.

References

- T. Caraballo, J. Q. Duan, K. N. Lu, and B. Schmalfuß, Invariant manifolds for random and stochastic partial differential equations, *Adv. Nonlinear Stud.* 10(1) (2010) 23-52.
- [2] L. F. Guo and Q. X. Zhu, Stability analysis for stochastic Volterra-Levin equations with Poisson jumps: Fixed point approach, J. Math. Phys. 52, 042702 (2011), doi: 10.1063/1.3573598.
- [3] J. J. Levin, The asymptotic behavior of a Volterra equation, Proc. Amer. Math. Soc. 14(7) (1963) 534-541.
- [4] B. Li, The attracting set for impulsive stochastic difference equations with continuous time, *Appl. Math. Lett.* **25**(8) (2012) 1166-1171.
- [5] D. S. Li and D. Y. Xu, Attracting and quasi-invariant sets of stochastic neutral partial functional differential equations, *Acta Math. Scientia* **33B**(2) (2013) 578-588.
- [6] J. W. Luo, Fixed points and exponential stability for stochastic Volterra-Levin equations, J. Comp. Appl. Math 234 (2010) 934-940.
- [7] X. Mao, Stochastic Differential Equations and Applications, Horwood Publishing Limited, Chichester, UK, 1997.
- [8] B. Øksendal, Stochastic Differential Equations, Springer, New York, 6th ed., 2005.
- [9] V. Volterra, Sur la théorie mathématique des phénomès héréditaires, J. Math. Pures Appl. 7(9) (1928) 249-298.
- [10] L. Wang and D. S. Li, Impulsive-integral inequalities for attracting and quasiinvariant sets of impulsive stochastic partial differential equations with infinite delays, J. Ineq. Appl. 2013(338) (2013) 11 pages, doi:10.1186/1029-242X-2013-338.
- [11] D. Y. Xu, Invariant and attracting sets of Volterra difference equations with delays, Comput. Math. Appl. 45 (2003) 1311-1317.
- [12] D. Y. Xu and H. Y. Zhao, Invariant set and attractivity of nonlinear differential equations with delays, Appl. Math. Lett. 15 (2002) 321-325.

Received March 2014; revised May 2014.

email: journal@monotone.uwaterloo.ca http://monotone.uwaterloo.ca/~journal/