1112-65-608 **Xiaofan Li*** (lix@iit.edu), 10 W 32nd St, E1-117C, Chicago, IL 60616, and **Ting Gao** and **Jinqiao Duan** (duan@iit.edu), Chicago, IL 60616, and **Renming Song**. *Numerical methods for nonlocal equations due to Lévy processes.*

The mean first exit time, escape probability and transitional probability density are utilized to quantify dynamical behaviors of stochastic differential equations with non-Gaussian α-stable type Lévy motions. Taking advantage of the Toeplitz matrix structure of the time-space discretization, a fast and accurate numerical algorithm is proposed to simulate the nonlocal Fokker-Planck equations on either a bounded or infinite domain. Under a specified condition, the scheme is shown to satisfy a discrete maximum principle and to be convergent. The numerical results for two prototypical stochastic systems, the Ornstein-Uhlenbeck system and the double-well system are shown (Received August 11, 2015)