

1046-60-1860

Dervis Bayazit* (dbayazit@math.fsu.edu), FSU Mathematics, 208 Love Building, 1017 Academic Way, Tallahassee, FL 32306-4510, and **Craig A. Nolder** (nolder@math.fsu.edu), FSU Mathematics, 208 Love Building, 1017 Academic Way, Tallahassee, FL 32306-4510. *An Exact Malliavin Weight for Variance Gamma and Normal Inverse Gaussian Processes: Sensitivity Analysis of European Style Options*. Preliminary report.

The main objective of this work is to find a Malliavin weight in order to calculate the delta of an European style option where the underlying asset is a Variance Gamma process or a Normal Inverse Gaussian process. We obtained a Malliavin integration by parts formula for a general multidimensional random variable which has an absolutely continuous law with a differentiable density for at least one of the dimensions. We give an explicit expression for the weight which is used in Monte Carlo simulations. We measure performance of the results of this approach in terms of the analytical results that we obtained by the inverse Fourier transform method. Also, we compare the results of Malliavin approach with the usual finite difference method. We observe that the Malliavin approach becomes extremely efficient for a discontinuous payoff.

Key words: Malliavin calculus, Monte-Carlo simulations, Variance Gamma process, Normal Inverse Gaussian process, sensitivity analysis, Fast Fourier Transform methods. (Received September 16, 2008)