Perturbations of Lévy Processes Using the Feynman Functional
ARJUNA FLENNER, NAWC China Lake, BRIAN DEFACIO, University of Missouri-Columbia
— The Wiener process is an example of a stable Lévy process, and the stable Lévy processes have been used as a model for many Physical systems as well as Financial Mathematics. Using the heat semigroup, the Feynman-Kac formula provides a connection between the Wiener process and Feynman's path integral. DeFacio, Johnson, and Lapidus were able to expand upon this method to formulate a rigorous Feynman Functional for certain semigroup operators. It is possible to add a potential term to these operators in order to investigate the effect perturbations have on stable Lévy processes. With restrictions on the potential, these perturbations can be calculated using the methods developed for the Feynman path integral, and formal manipulation of the perturbations yields previous results in the literature. An overview of the Feynman Functional formulation for Lévy processes will be given, a few examples of perturbed Lévy processes will be shown, and some Mathematical and computational difficulties will be discussed.

Arjuna Flenner
NAWC China Lake

Date submitted: 14 Dec 2004   Electronic form version 1.4