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Md Al Masum Bhuiyan* (mbhuiyan@miners.utep.edu), 1127 Los Angeles Dr., Apt 03, El Paso, TX 79902, **Maria C. Mariani**, 500, W. University Ave, El Paso, TX 79968, and **Osei K. Tweneboah**, 500 W University Ave., El Paso, TX 79968. *The Application of Stochastic Differential Equation to modeling high frequency financial data and other seismic data*. Preliminary report.

This work is about the study of a stochastic differential equation. We propose a differential equation arising from the superposition of independent Ornstein–Uhlenbeck processes driven by Gamma (a, b) process. The superposition of independent Gamma (a, b) Ornstein–Uhlenbeck processes offers analytic flexibility and provides a class of continuous time processes capable of exhibiting long memory behavior. We test the flexibility for two types of data: high frequency financial data and seismic data, where the maximum likelihood estimation technique does not fit well into the data. We see that the Ornstein Uhlenbeck process followed in this work simulates well the financial and seismic data. The simulated data mimics the original data, which is observed from the estimates of the root mean square error. The independent Ornstein–Uhlenbeck driven by Gamma (a, b) process aligns our estimation algorithm with long memory behavior. The presence of long memory suggests that the current information is highly correlated with past information at different levels. This fact facilitates parameter estimation and prediction for data. (Received September 04, 2018)