

Computational Finance Lab - 3

Question - 1 : Brownian motion

Generate a Regular Brownian Motion (W) using Numpy. The number of increments $N = 64$ and a random seed = 5. Use normal distribution $N(0,1)$ to get the random normal variables from. Plot the graph of this Brownian motion. Time = 10

Question - 2 : Geometric Brownian motion

Using the standard equation of Geometric Brownian Motion (GBM), plot a GBM graph for an arbitrary stock. Given:

1. (Initial stock S_0 price) = 55.25
2. μ (returns or drift coefficient) = 0.15
3. σ (volatility or diffusion coefficient) = 0.4
4. W = Brownian motion
5. T (time duration) = 2
6. N (number of increments) = 64

Question - 3 : Reliance stock using GBM

We will test the geometric Brownian equation with actual stock price data of Reliance Industries Ltd. We have provided you with an Relince.csv file containing the prices of Reliance's stock from 2011-01-01 to 2021-02-17.

- A. Generate μ and σ from the stock data in the file.
- B. From μ and σ calculated above, use the function/code written in the above question to generate a GBM plot for Reliance stock. You are given the following parameters
 - a. Use seed = 22
 - b. $T = 2.0$, $N = 64$