C++ Programming for Financial Engineering Level 9 Group D Writeup

QuantNet

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a)

The working code for Group D is stored in **Projects/MC folder**. See functions implemented in TestMC.cpp

b)

Batch 1 Call SD



Batch 1 Call SE



Batch 1 Put SD



Batch 1 Put SE



Batch 2 Call SD



Batch 2 Call SE



Batch 2 Put SD



Batch 2 Put SE



From the output of Batch 1 and Batch 2, we observe that SE tends to decrease as NSIM increases, while SD almost stays the same. There appears to be no relationship between N and SD or SE.

This result is expected. As the Monte Carlo simulations are obtained by adding multiple independent random variables coming from a normal distribution. The standard deviation measures the amount of variability, or dispersion, for a subject set of data from the mean. This value should not change very much as the number of simulations increases, because these data should fall into a normal distribution. Increasing the number of steps will also not change this value, since the sum of mean and variance these independent variables are the same, no matter how you dissect the variables.

On the other hand, standard error measures how far the sample mean of the data is likely to be from the true population mean. The law of large numbers suggests that as the number of simulations increases, the mean of the stimulations is converging to the population mean. Thus, SE should decrease as NSIM increases.