**Project C: Monte Carlo 101**

b.)

Batch 1: C = 2.13337, P = 5.84628

Trial 1:

NT= 250, NSIM = 25’000

Price, after discounting:

Call = 2.15494,Put = 5.92214

Trial 2:

NT = 750, NSIM = 75000

Price, after discounting:

Call = 2.14902, Put = 5.84974

Trial 2:

NT= 750, NSIM = 750’000

Price, after discounting:

Call = 2.13226, Put = 5.8411

In general, as both NSIM and NT increases, we seethe prices for both call & put options are getting closer to values computed by exact solution.

Then we increase NT up until 750. As NSIM increases, with NT held constant at 750, we see that prices for both call & put options are getting closer to the values computed by exact solution. As NSIM increases, with NT held constant at 750, we managed to improve its efficiency up to two decimal points.

Batch 2: Actual C = 7.96557, P = 7.96557

Trial:

NT= 250 , NSIM = 25000

Price, after discounting:

Call = 7.99599,Put = 8.10427

Trial:

NT= 750, NSIM = 150’000

Price, after discounting:

Call = 7.96056, Put = 7.98944

Trial:

NT = 750, NSIM = 75000

Price, after discounting:

Call = 7.99877, Put = 7.96816

Discussion:

In general, as both NSIM and NT increases, we see that the prices for both call & put options are getting closer to values computed by exact solution.

Then we increase NT up until 750. (Comment: It seems increasing both NT & NSIM seems to work well for Put option price, up until a certain number of NT& NSIM. )

In this case, we see that with NT held constant at 750, computed put option price with smaller NSIM yields a closer value to exact solution’s value. However, computed call option price with bigger NSIM yields closer value to exact solution’s value.

c.)

Batch 4: Actual C = 92.17570, P = 1.24750

Accuracy to two places behind the decimal point.

How is accuracy affected by different values for NT/NSIM ?

Trial:

NT = 750, NSIM = 800000

Price, after discounting:

C= 92.1709, P = 1.2505

Trial:

NT = 3000, NSIM = 10000

Price, after discounting:

C= 94.6981, P = 1.24411

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Discussion:

* In the case of Call option price, we assigned NT = 750 & NSIM = 750’000 in order to get an accuracy to two places behind the decimal point.
* In the case of Put option price, we assigned NT = 3000 & NSIM = 10’000 in order to get an accuracy to two places behind the decimal point.

How is the accuracy affected by different values for NT/NSIM?

* For call option (for batch 4), when we have smaller NT & bigger NSIM the computed call option price is closer to the exact solution’s value.
* Conversely, for put option (for batch 4), when we have bigger NT & smaller NSIM the computed put option price is closer to the exact solution’s value.

Example Trials from Batch 4 ( reference to see the pattern)

Trial:

NT = 500, NSIM = 10000

Price, after discounting:

C= 95.4014 , P =1.30399

Trial:

NT = 750, NSIM = 100000

Price, after discounting:

C= 93.3237 , P = 1.25471

Trial:

NT = 750, NSIM = 200000

Price, after discounting:

C= 92.3465 , P = 1.25894

Trial:

NT = 750, NSIM = 400000

Price, after discounting:

C= 92.1128 , P = 1.2565