Level 9 Homework Group D

#### Advanced Monte Carlo Simulation

###### b) Experiment with different values of NT (time steps) and NSIM (simulations or draws)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | NT | NSIM | Call | | | Put | | |
| Price | SD | SE | Price | SD | SE |
| Batch 1 | 10 | 105 | 2.11117 | 4.43419 | 0.0140221 | 5.8456 | 6.08728 | 0.0192497 |
| 10 | 106 | 2.11674 | 4.44983 | 0.00444983 | 5.84074 | 6.08132 | 0.00608132 |
| 10 | 107 | 2.11928 | 4.45082 | 0.00140747 | 5.83512 | 6.08127 | 0.00192307 |
| 100 | 105 | 2.13043 | 4.51298 | 0.0142713 | 5.87321 | 6.05775 | 0.0191563 |
| 100 | 106 | 2.13221 | 4.51624 | 0.00451624 | 5.85125 | 6.04898 | 0.00604898 |
| 100 | 107 | 2.13273 | 4.51954 | 0.00142604 | 5.84183 | 6.04801 | 0.00191286 |
| Batch 2 | 10 | 105 | 7.9513 | 12.9674 | 0.0410067 | 8.0067 | 10.5416 | 0.0333355 |
| 10 | 106 | 7.95922 | 13.0034 | 0.0130034 | 7.99098 | 10.5321 | 0.0105321 |
| 10 | 107 | 7.96938 | 13.0058 | 0.0041128 | 7.98315 | 10.5304 | 0.00333001 |
| 100 | 105 | 7.94362 | 13.1477 | 0.0415767 | 8.0079 | 10.4359 | 0.0330012 |
| 100 | 106 | 7.9625 | 13.1517 | 0.0131517 | 7.97439 | 10.4143 | 0.0104143 |
| 100 | 107 | 7.96624 | 13.1354 | 0.00415378 | 7.96088 | 10.4125 | 0.00329271 |

Note: Batch 2 is totally symmetric, Call price should be same as Put price. So there is no need to compute again.

Call price is generally higher with larger NT and larger NSIM. Put price is generally lower with larger NSIM but higher with larger NT. SD of call increases as NT or NSIM increases. SD of put changes in the opposite way. SE of call increases with NT. SE of put decreases with NT. SE of call and put decrease by about sqrt(N) times when NSIM increases by N times.

Overall speaking, Higher NT and NSIM gives more accurate results.