Level 9 Homework Group C

#### Monte Carlo Method

b) how many time steps and draws do you need in order to get the same accuracy as the exact solution? How is the accuracy affected by different values for NT/NSIM?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | NT | NSIM | Price | |
| Call | Put |
| Batch 1 | 10 | 105 | 2.11117 | 5.8456 |
| 10 | 106 | 2.11674 | 5.84074 |
| 10 | 107 | 2.11928 | 5.83512 |
| 100 | 105 | 2.13043 | 5.87321 |
| 100 | 106 | 2.13221 | 5.85125 |
| 100 | 107 | 2.13273 | 5.84183 |
| Batch 2 | 10 | 105 | 7.9513 | 8.0067 |
| 10 | 106 | 7.95922 | 7.99098 |
| 10 | 107 | 7.96938 | 7.98315 |
| 100 | 105 | 7.94362 | 8.0079 |
| 100 | 106 | 7.9625 | 7.97439 |
| 100 | 107 | 7.96624 | 7.96088 |

We never get to exact solution no matter how we set NT and NSIM. Larger NT and NSIM both bring up the accuracy.

###### c)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | NT | NSIM | Call | Put |
| Batch 4 | 30 | 105 | 83.74336 | 1.48684 |
| 30 | 106 | 83.84687 | 1.48943 |
| 100 | 105 | 89.42480 | 1.29604 |
| 100 | 106 | 89.52407 | 1.29275 |
| 300 | 105 | 91.60762 | 1.27204 |
| 1000 | 105 | 92.10005 | 1.25990 |
| 3000 | 104 | 92.18306 | 1.24411 |

When using NT = 3000 and NSIM = 10000, we have to two places behind the decimal point. In this case NSIM does not contribute much. Increasing of NT generates more accurate results.