

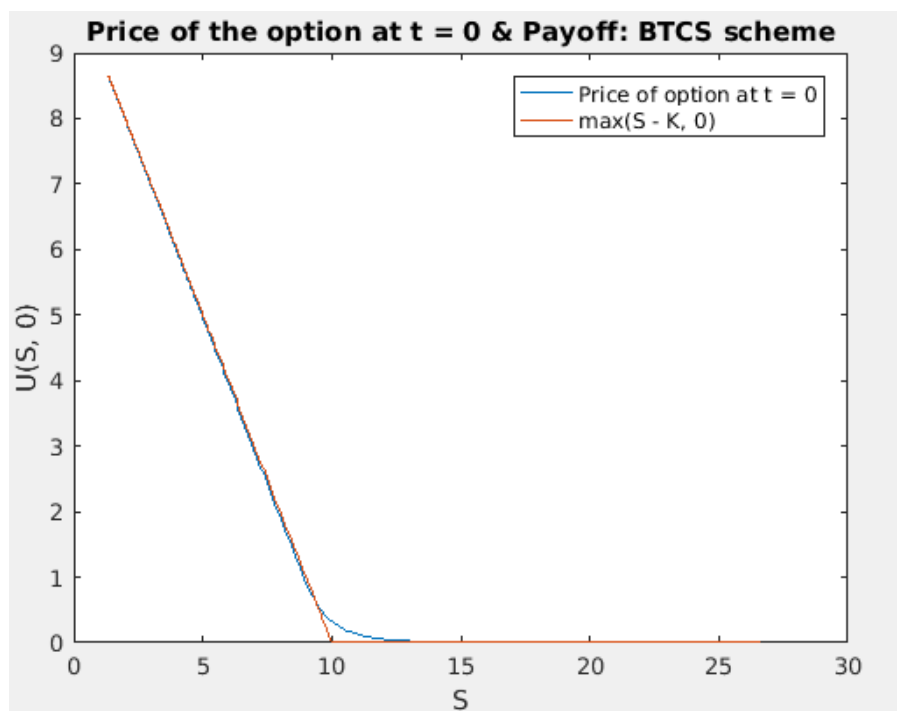
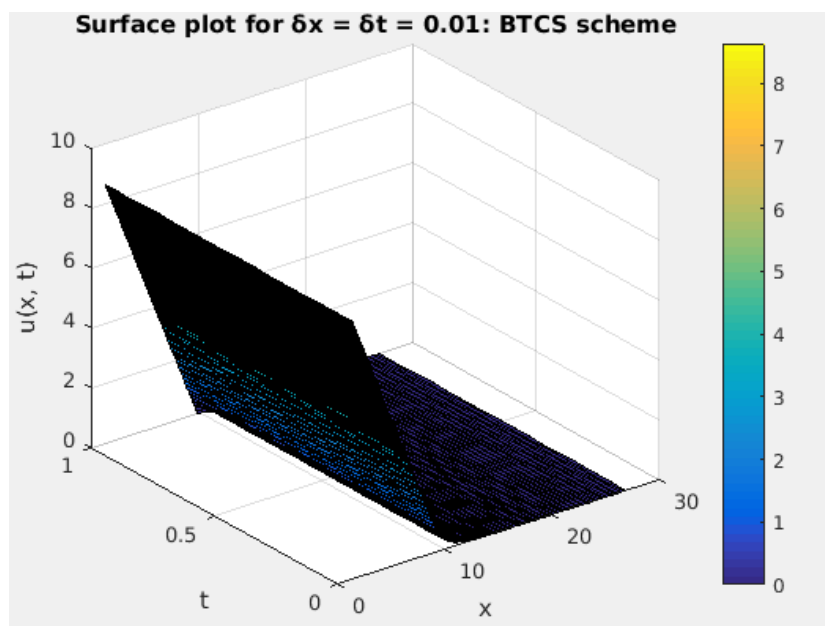
MA 473 : COMPUTATIONAL FINANCE

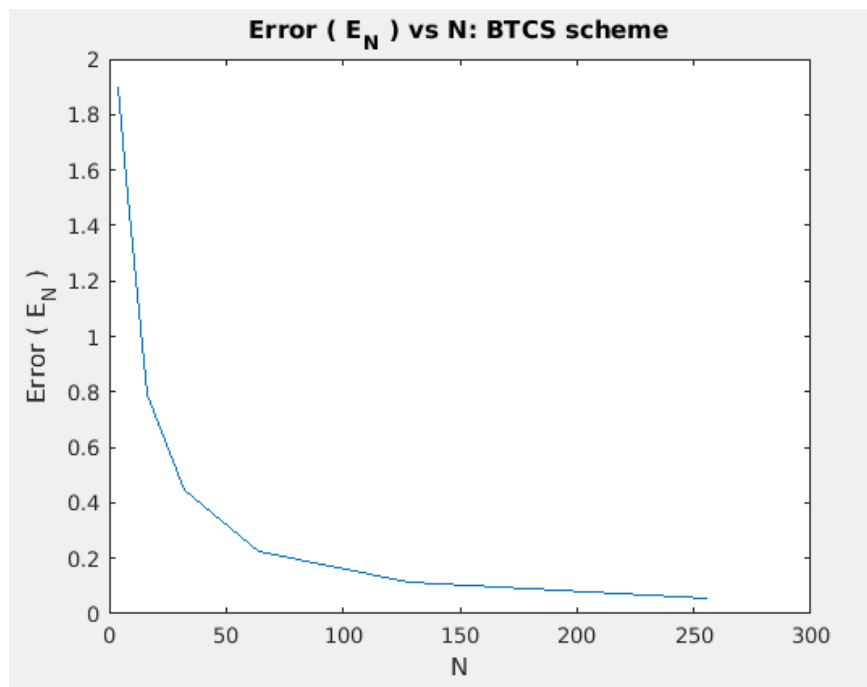
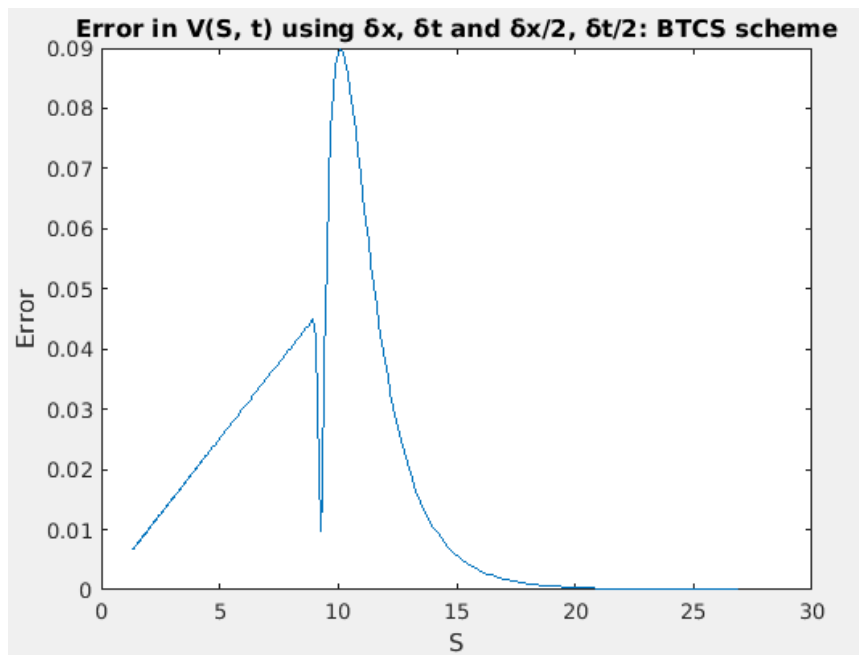
NAME : Aman Kumar

ROLL NO : 200123007

Q1.

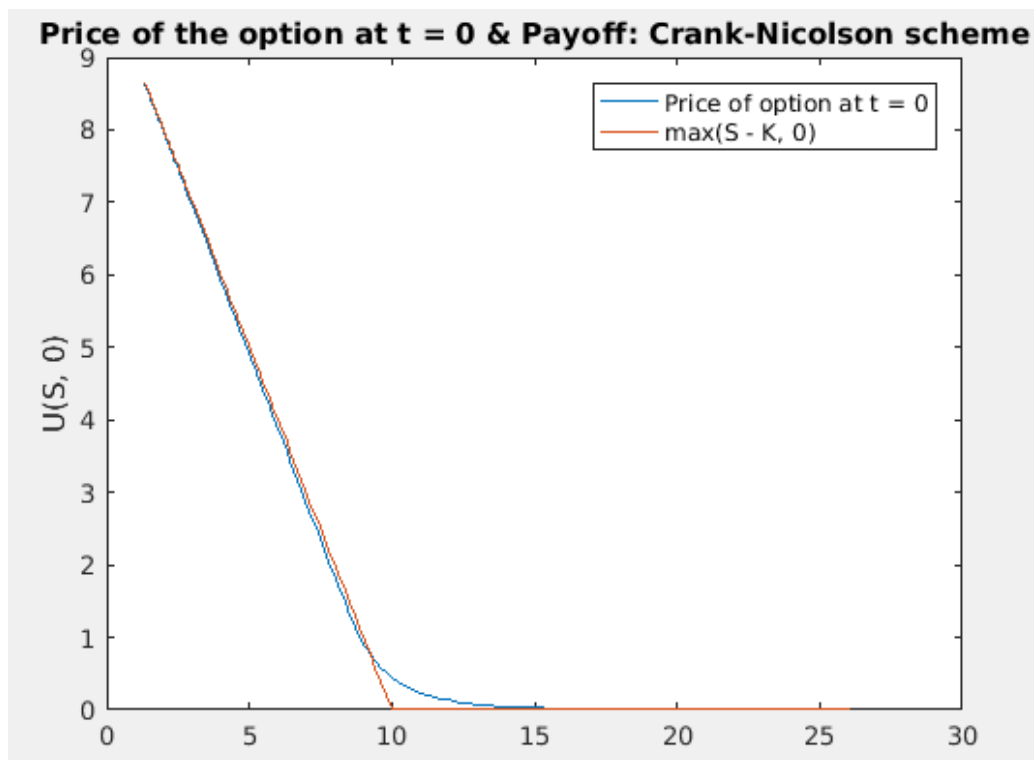
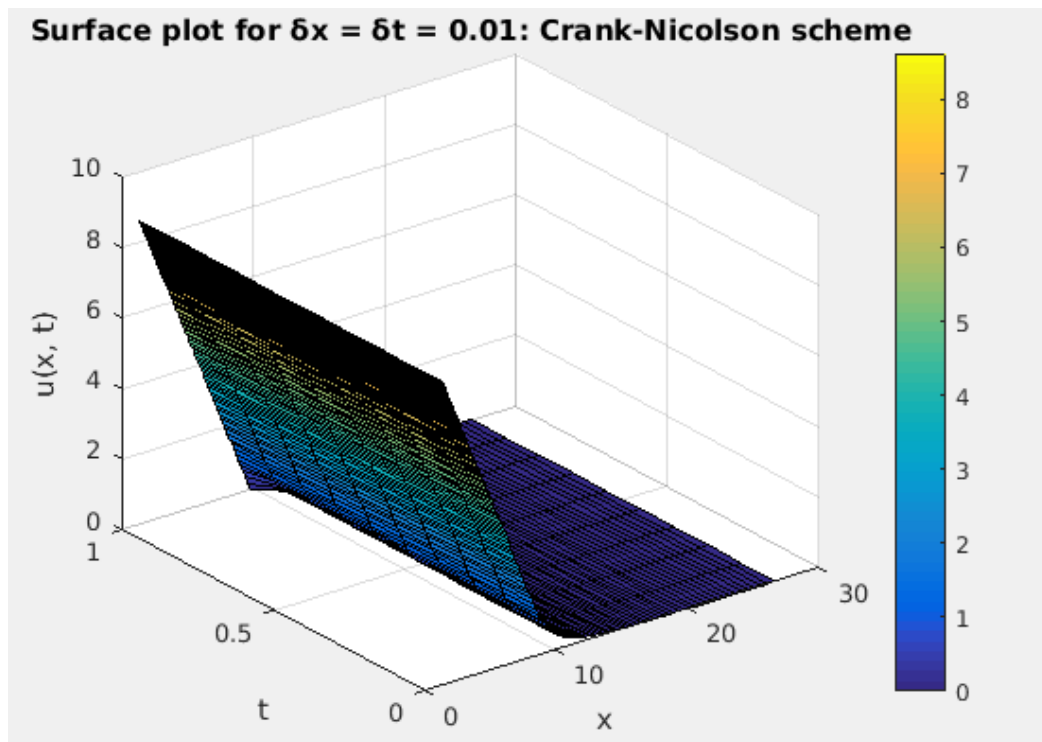
BTCS :



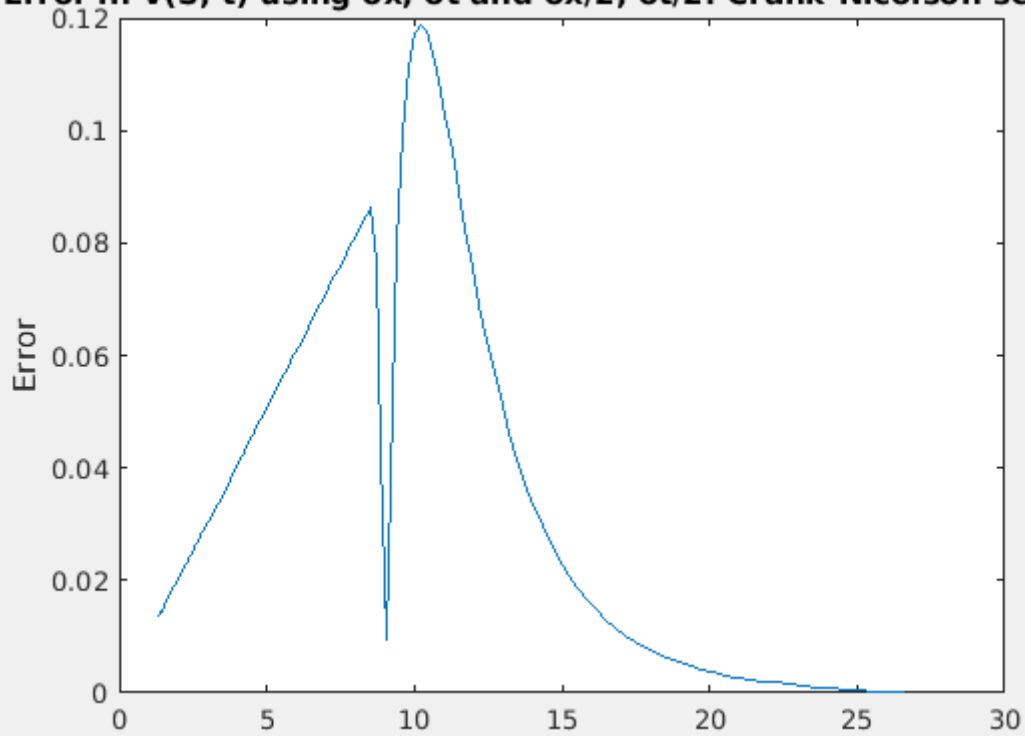


| ***** BTCS Scheme ***** | | | | | | |
|-------------------------|-----|----------|------------|-----------|------------|-----------|
| IDX | N | dx | dt | dx_2 | dt_2 | Max_error |
| 1 | 4 | 0.75 | 0.045 | 0.375 | 0.0225 | 1.8967 |
| 2 | 8 | 0.375 | 0.0225 | 0.1875 | 0.01125 | 1.5088 |
| 3 | 16 | 0.1875 | 0.01125 | 0.09375 | 0.005625 | 0.78974 |
| 4 | 32 | 0.09375 | 0.005625 | 0.046875 | 0.0028125 | 0.44384 |
| 5 | 64 | 0.046875 | 0.0028125 | 0.023438 | 0.0014062 | 0.22452 |
| 6 | 128 | 0.023438 | 0.0014062 | 0.011719 | 0.00070312 | 0.1156 |
| 7 | 256 | 0.011719 | 0.00070312 | 0.0058594 | 0.00035156 | 0.057968 |

CRANK NICHOLSON :-



Error in $V(S, t)$ using δx , δt and $\delta x/2$, $\delta t/2$: Crank-Nicolson scheme



***** Crank-Nicolson Scheme *****

| IDX | N | dx | dt | dx_2 | dt_2 | Max_error |
|-----|-----|----------|-----------|-----------|------------|-----------|
| 1 | 5 | 0.6 | 0.036 | 0.3 | 0.018 | 2.122 |
| 2 | 10 | 0.3 | 0.018 | 0.15 | 0.009 | 1.1404 |
| 3 | 20 | 0.15 | 0.009 | 0.075 | 0.0045 | 0.68733 |
| 4 | 40 | 0.075 | 0.0045 | 0.0375 | 0.00225 | 0.35011 |
| 5 | 80 | 0.0375 | 0.00225 | 0.01875 | 0.001125 | 0.18345 |
| 6 | 160 | 0.01875 | 0.001125 | 0.009375 | 0.0005625 | 0.092153 |
| 7 | 320 | 0.009375 | 0.0005625 | 0.0046875 | 0.00028125 | 0.046619 |

Error (E_N) vs N: Crank-Nicolson scheme

