Computational Finance MA473 Lab 05 06

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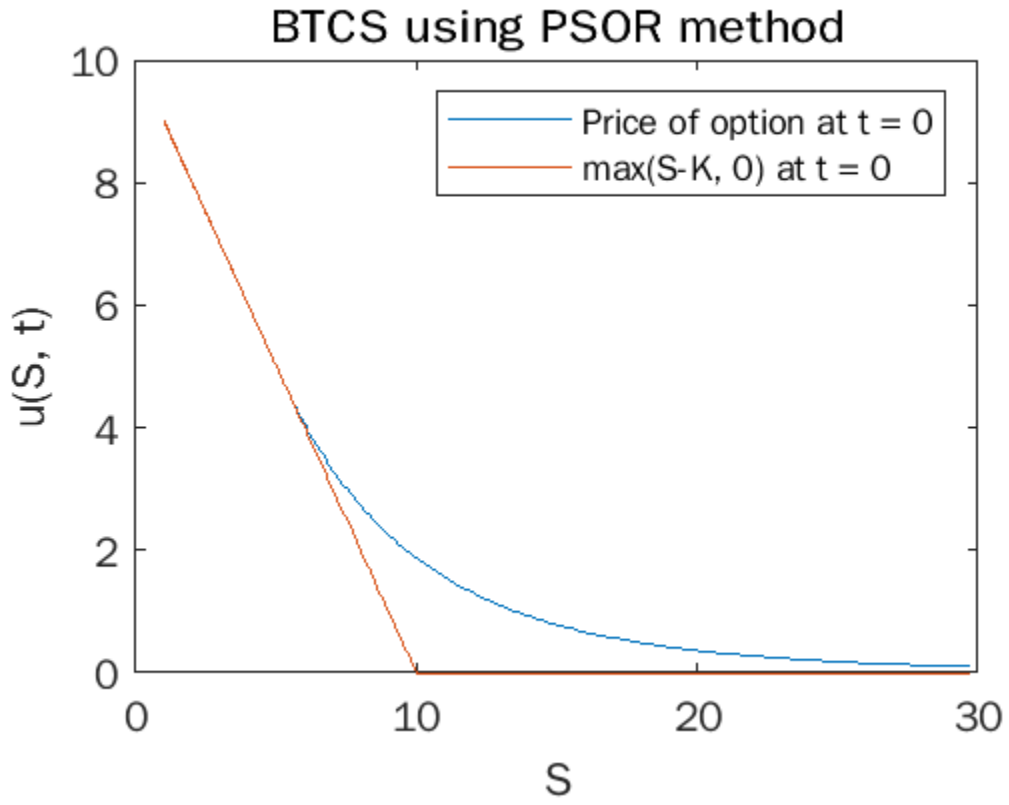
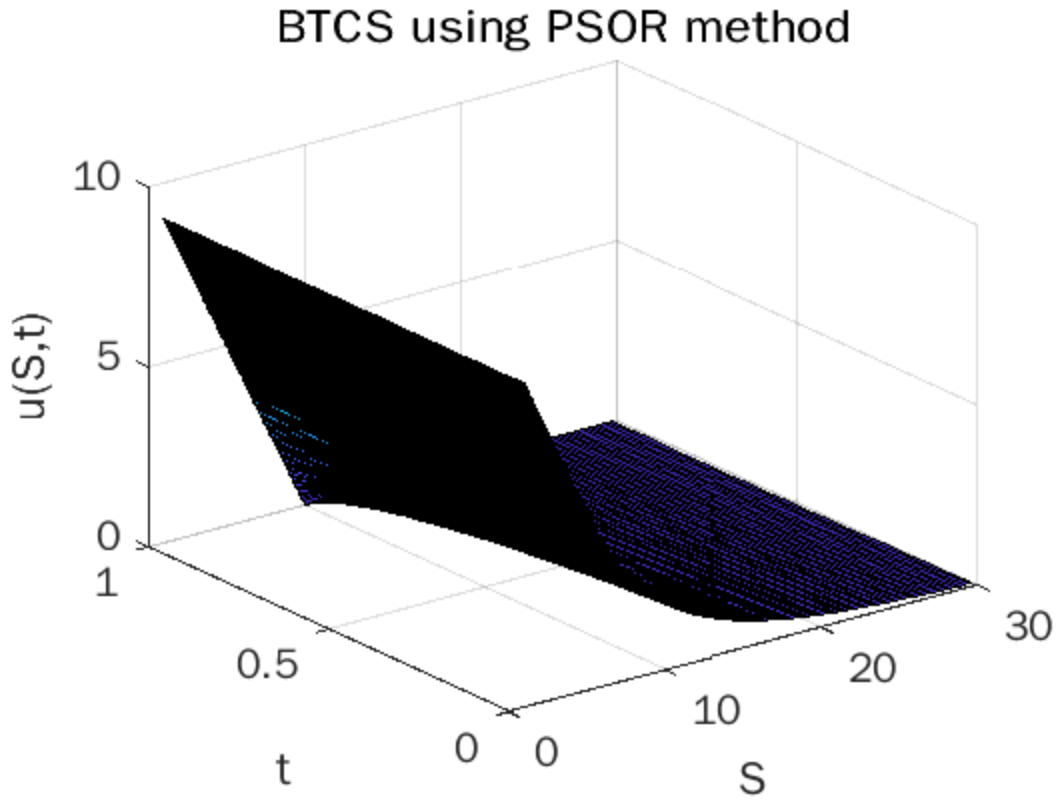
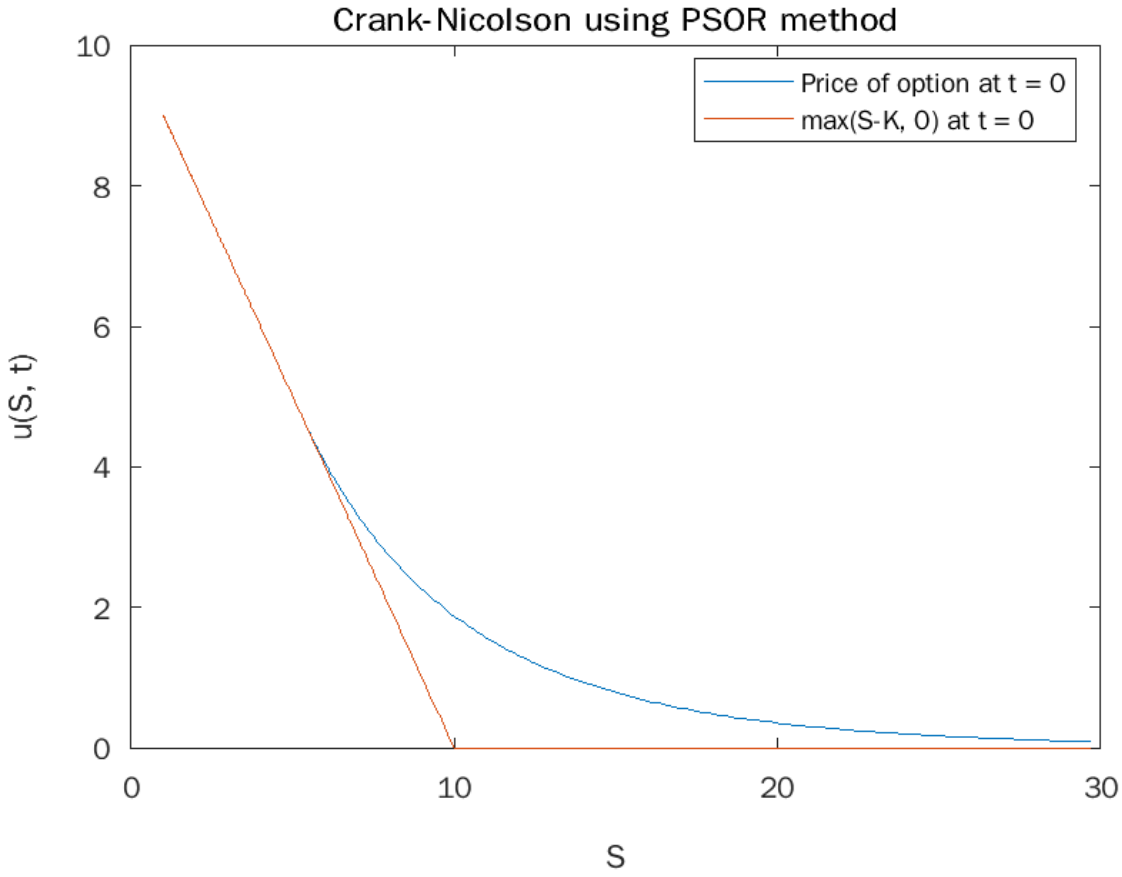
Roll No: **180123029**

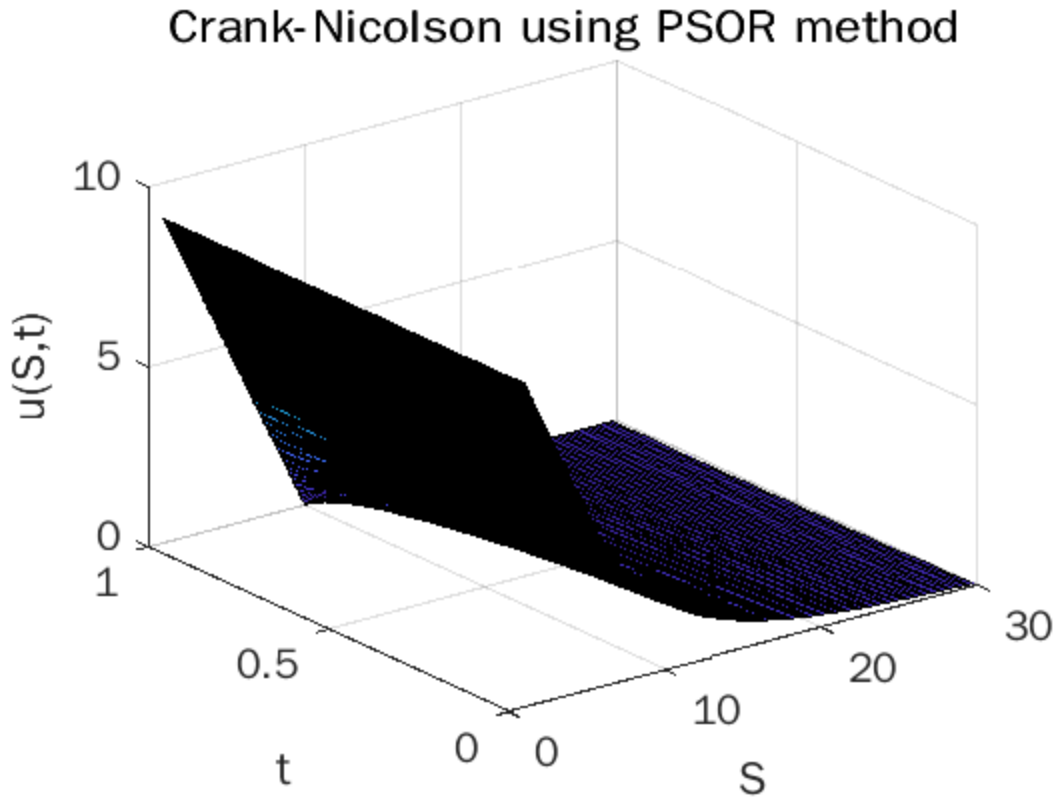
Ques.**1**

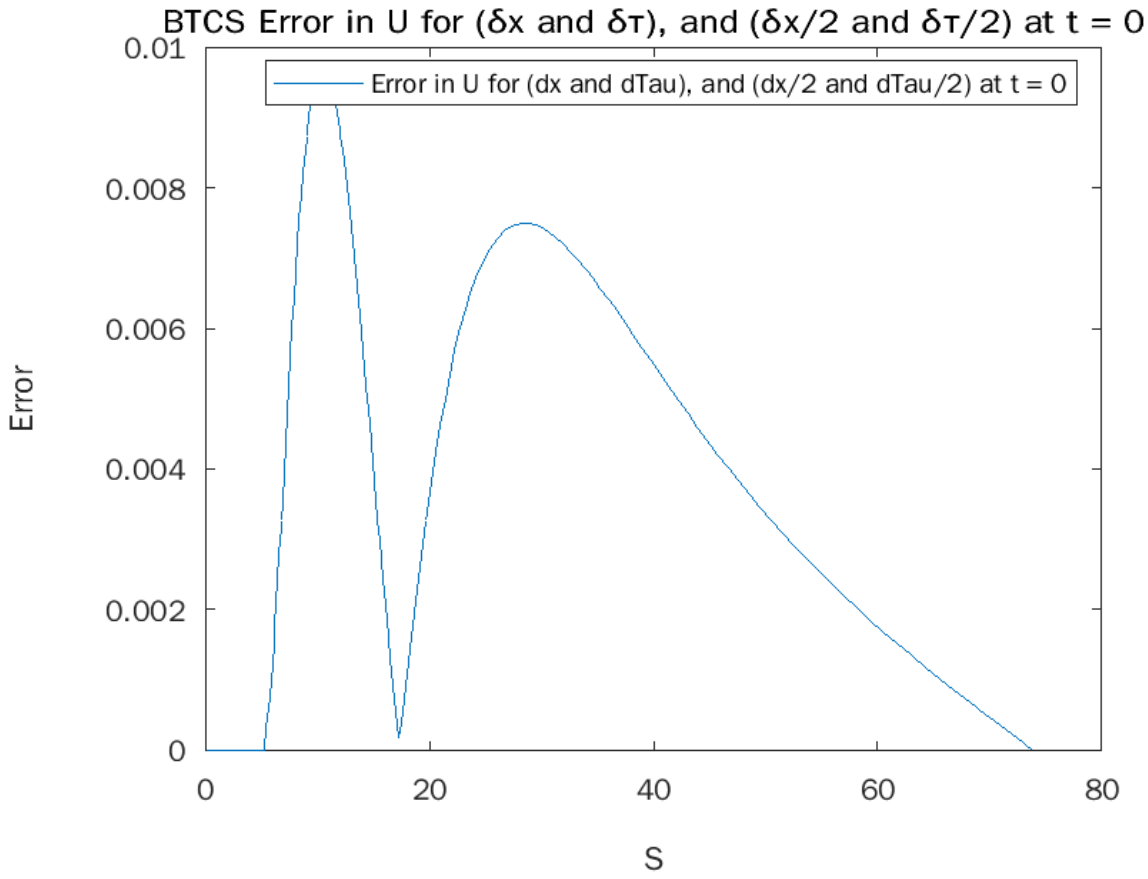
Pricing American Put using BTCS and Crank Nicolson with PSOR Method

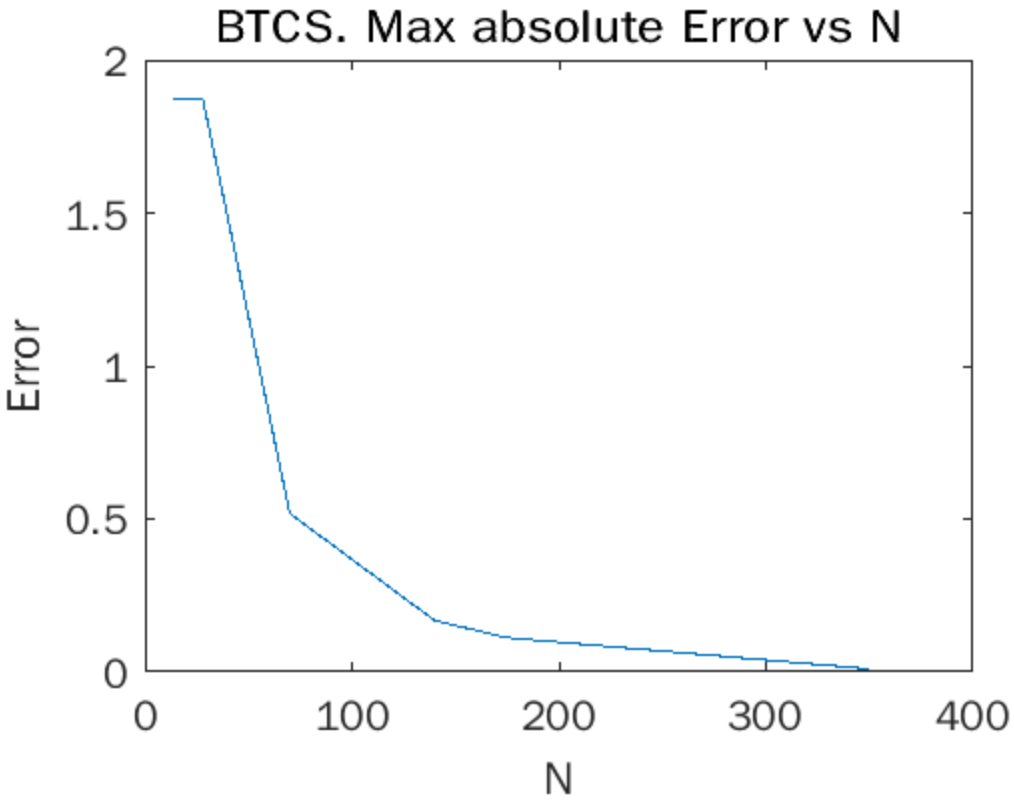


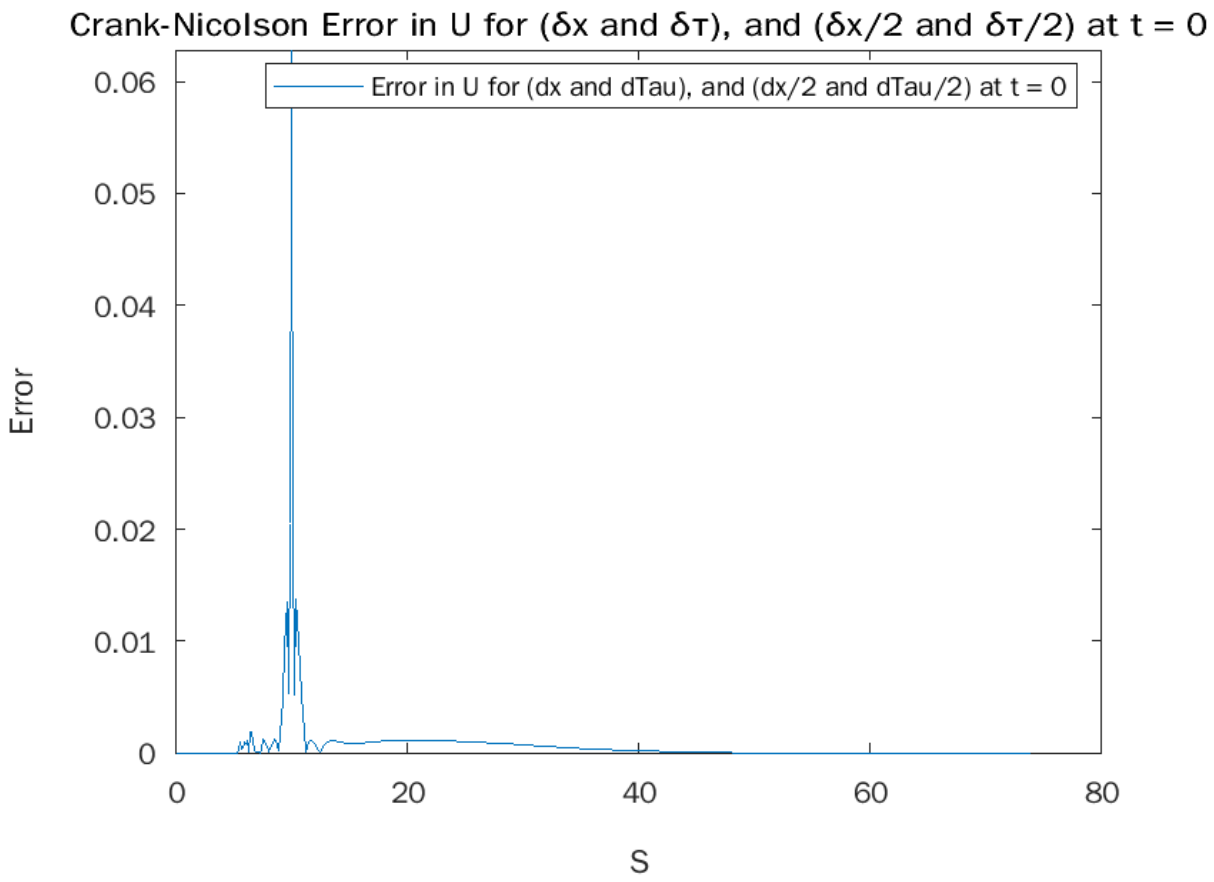

BTCS using PSOR method
u(S,t)
10
5
0
1
0.5
0
t
0
10
20
30
S

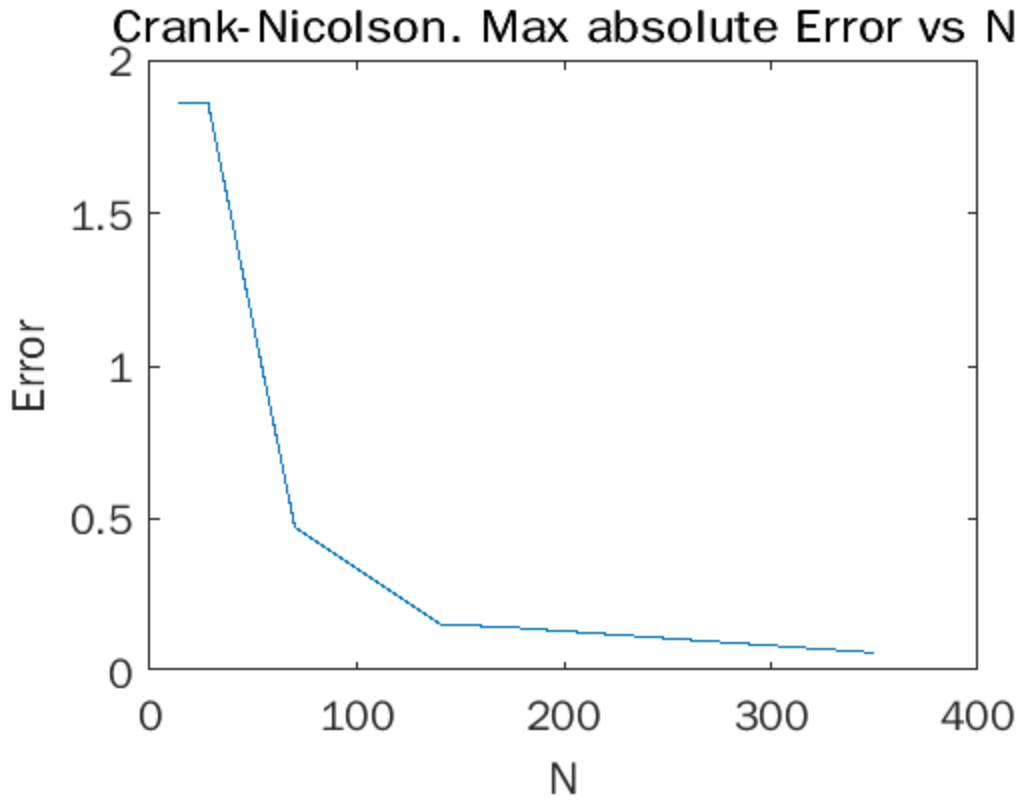

Crank-Nicolson using PSOR method
Price of option at t = 0
max(S-K, 0) at t = 0
u(S, t)
S
0
2
4
6
8
10
0
10
20
30


Crank-Nicolson using PSOR method
10
5
0
u(S,t)
1
0.5
0
t
0
10
20
30
S


BTCS Error in U for (δx and δτ), and (δx/2 and δτ/2) at t = 0
Error in U for (dx and dTau), and (dx/2 and dTau/2) at t = 0
0.01
0.008
0.006
0.004
0.002
0
Error
0
20
40
60
80
S

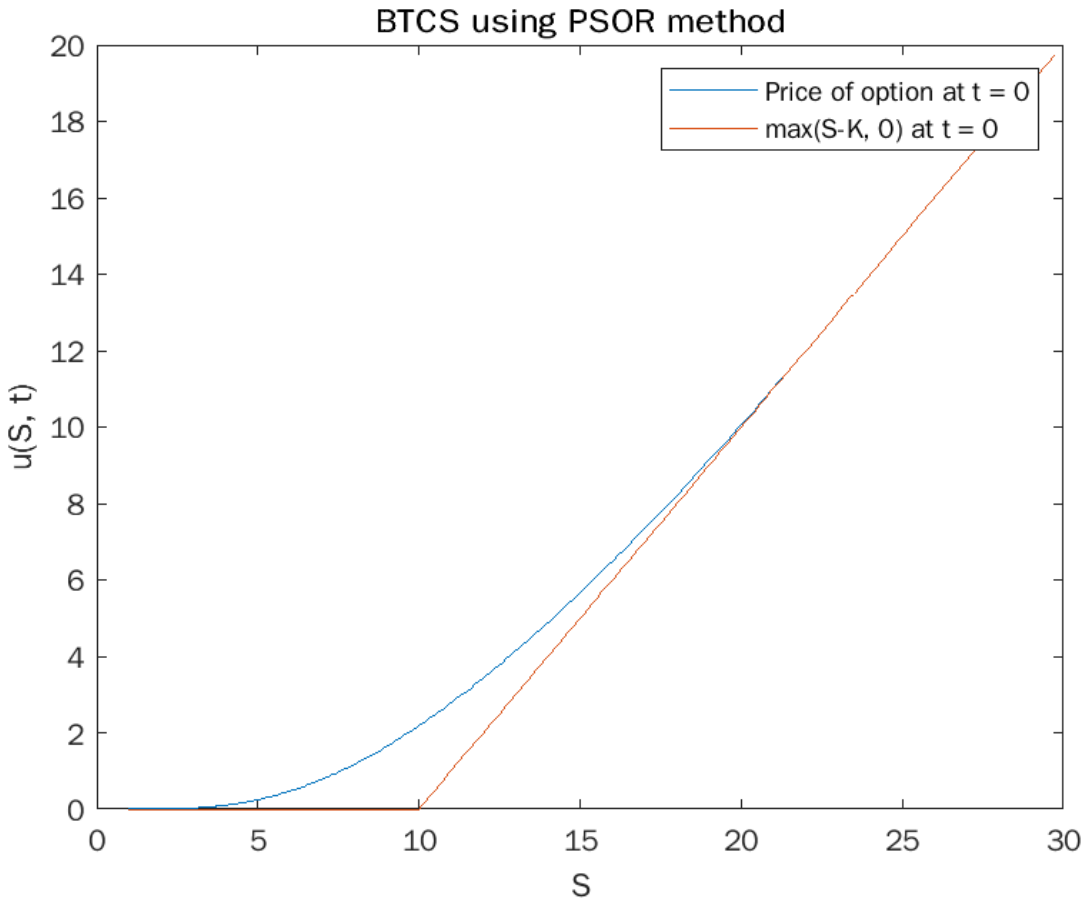

BTCS. Max absolute Error vs N
Error
N
0
0.5
1
1.5
2
0
100
200
300
400

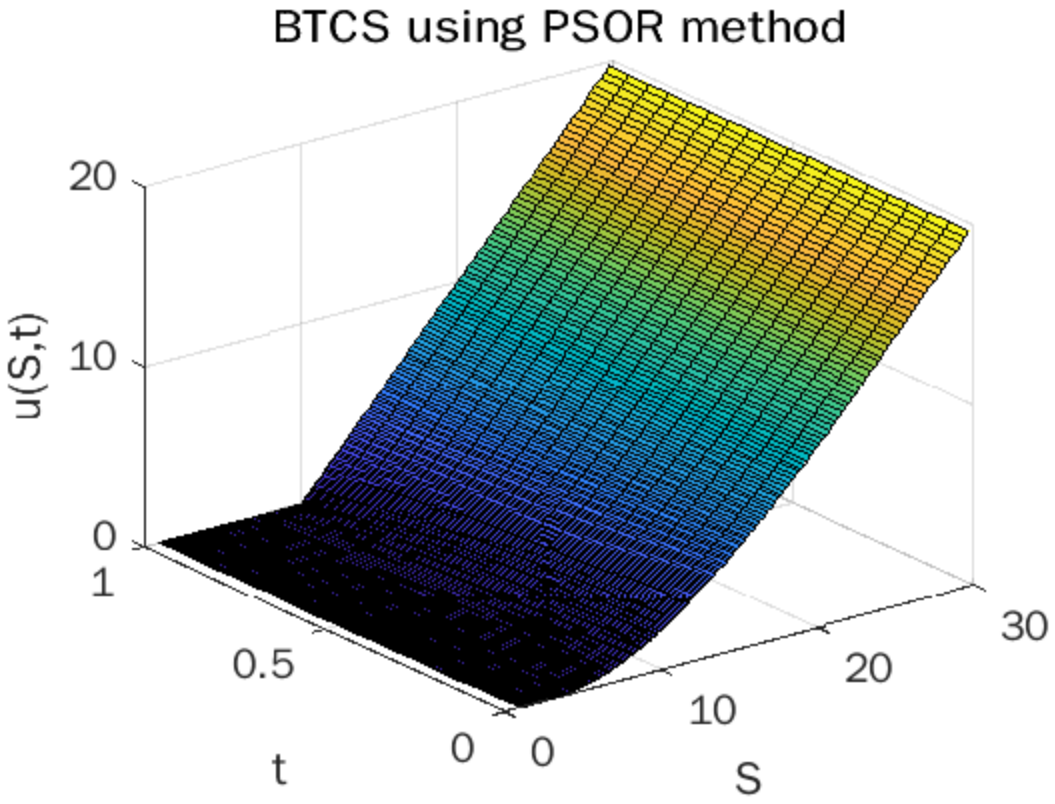

Crank-Nicolson Error in U for (δx and δτ), and (δx/2 and δτ/2) at t = 0
Error in U for (dx and dTau), and (dx/2 and dTau/2) at t = 0
0.06
0.05
0.04
0.03
0.02
0.01
0
Error
0
20
40
60
80
S

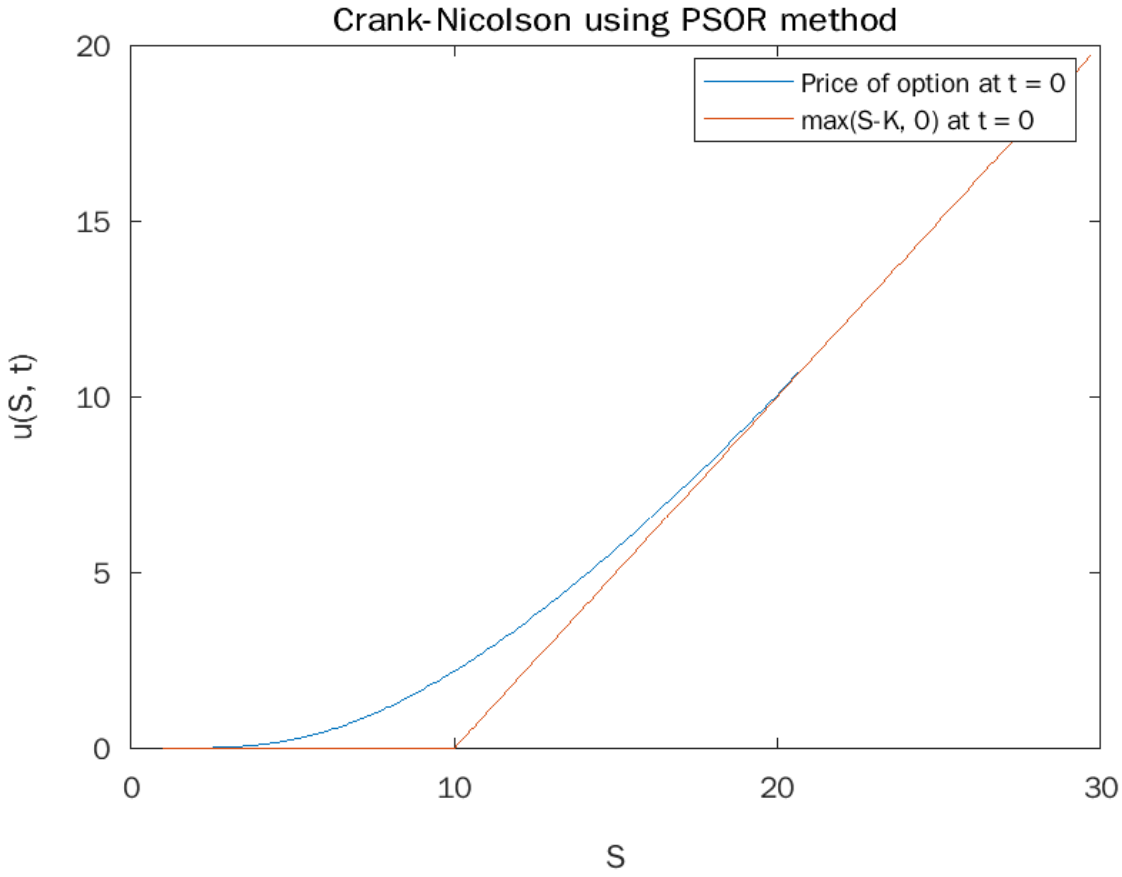

Crank-Nicolson. Max absolute Error vs N
Error
N
0
0.5
1
1.5
2
0
100
200
300
400

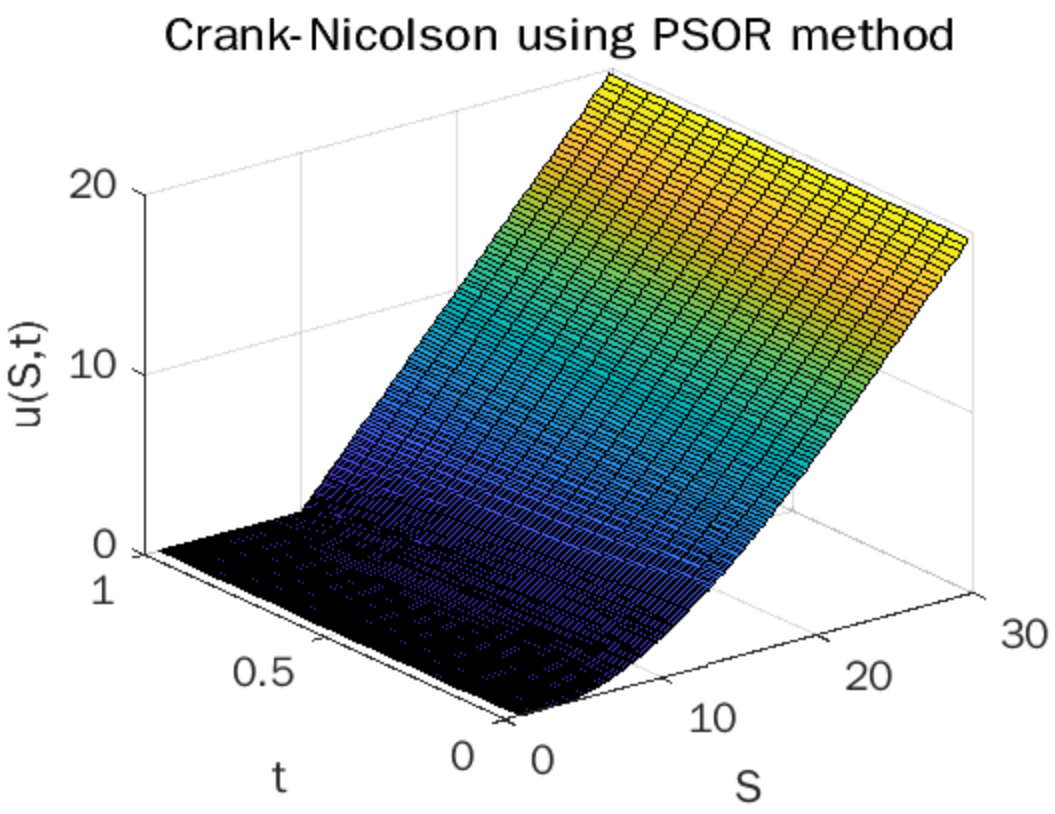
Ques.**2**

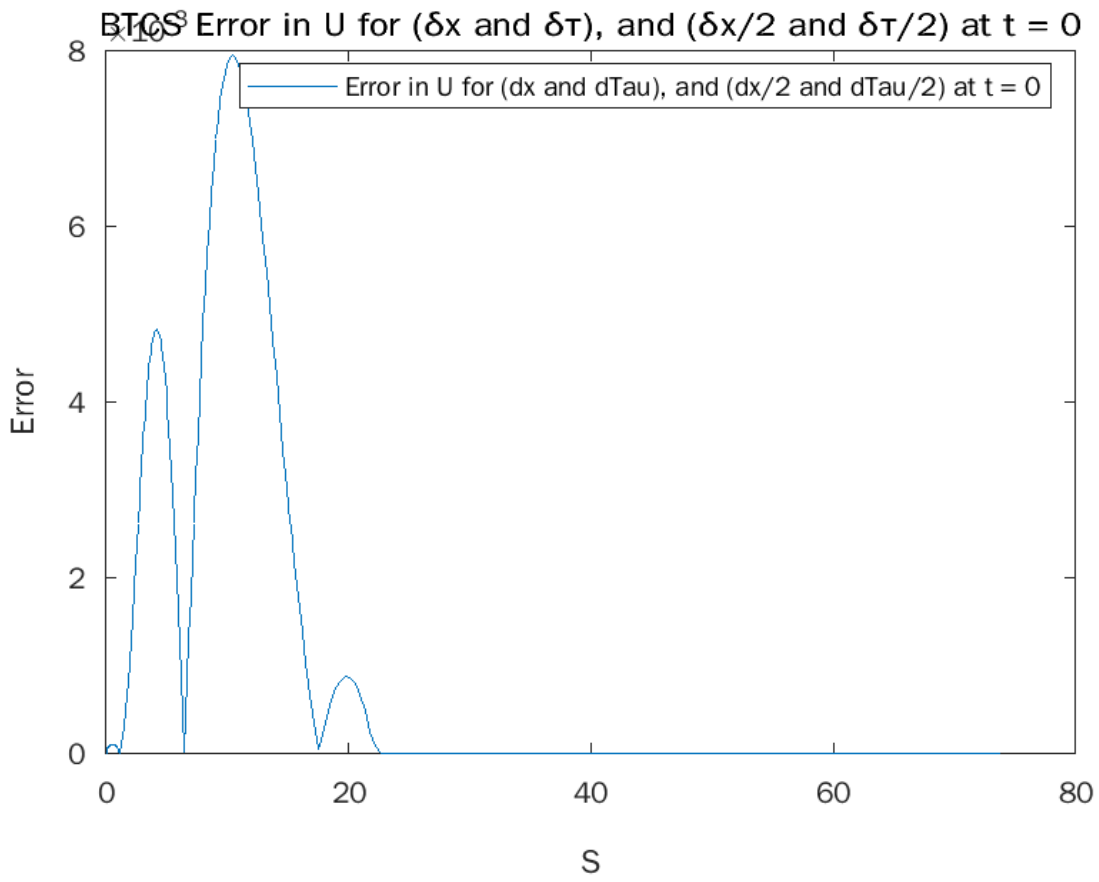
Pricing American Call using BTCS and Crank Nicolson with PSOR Method

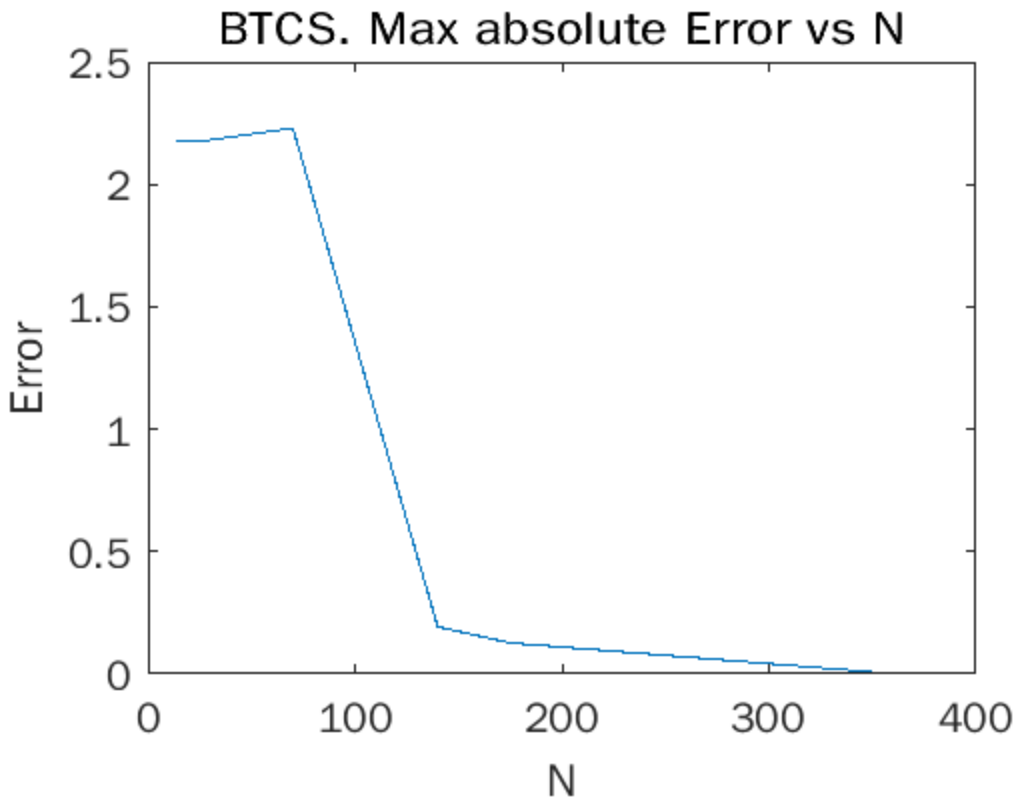


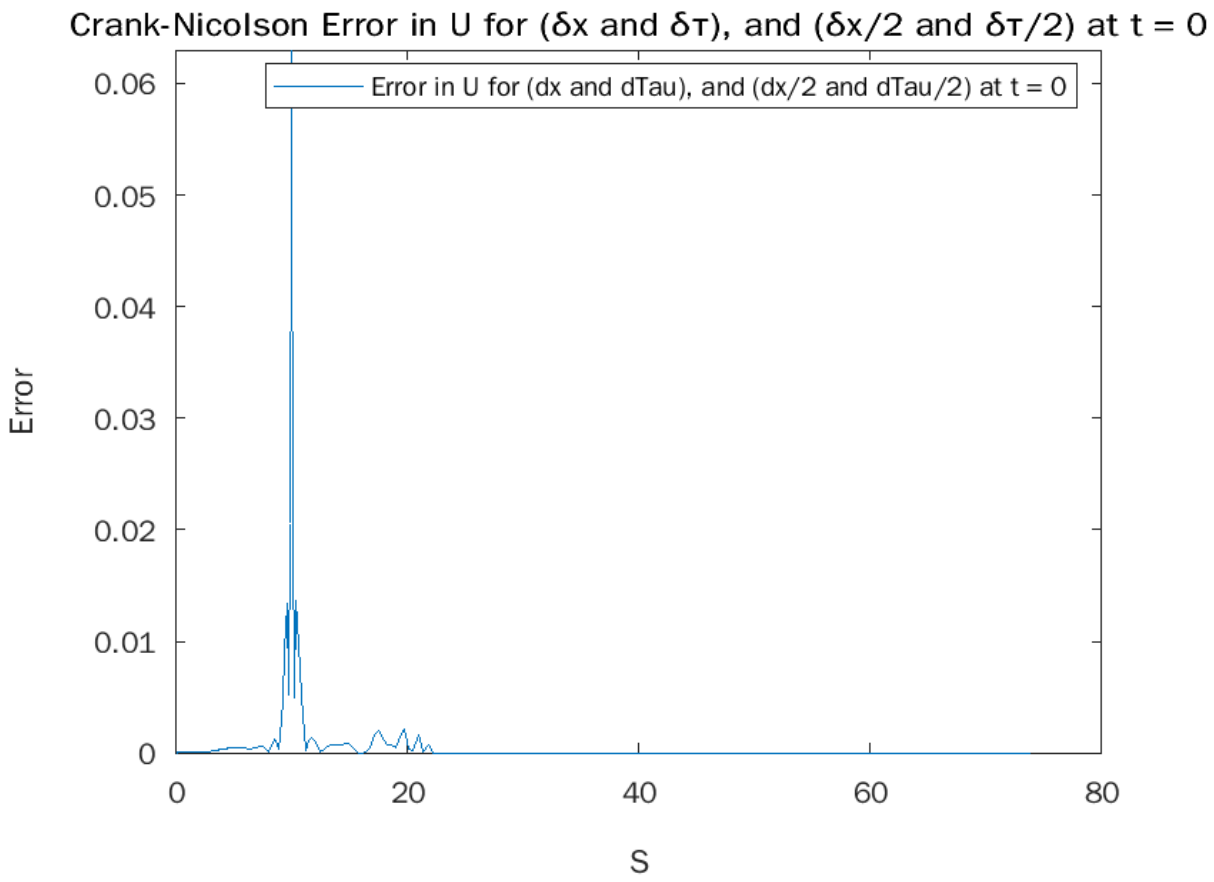

BTCS using PSOR method
u(S,t)
20
10
0
1
0.5
0
t
0
10
20
30
S

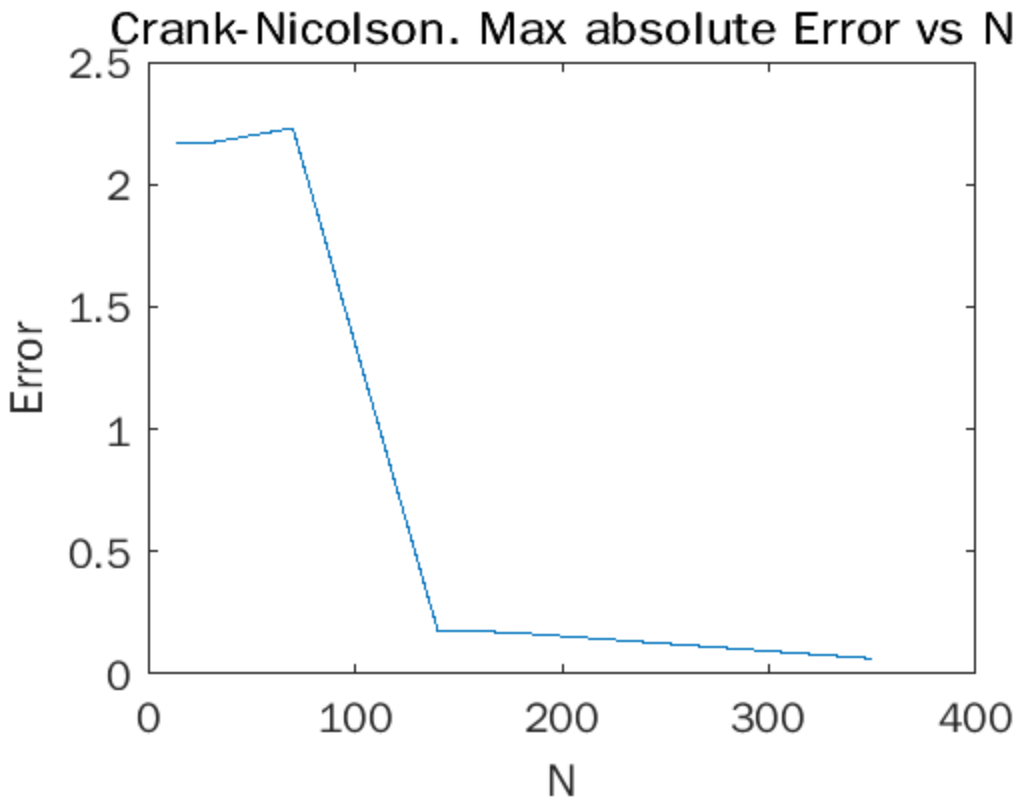

Crank-Nicolson using PSOR method
Price of option at t = 0
max(S-K, 0) at t = 0
u(S, t)
S
0
5
10
15
20
0
10
20
30


Crank-Nicolson using PSOR method
u(S,t)
20
10
0
1
0.5
0
t
0
10
20
30
S


BTCS Error in U for (δx and δτ), and (δx/2 and δτ/2) at t = 0
×10^-3
Error in U for (dx and dTau), and (dx/2 and dTau/2) at t = 0
Error
S
0
2
4
6
8
0
20
40
60
80


BTCS. Max absolute Error vs N
Error
N
0
0.5
1
1.5
2
2.5
0
100
200
300
400


Crank-Nicolson Error in U for (δx and δτ), and (δx/2 and δτ/2) at t = 0
Error in U for (dx and dTau), and (dx/2 and dTau/2) at t = 0
0.06
0.05
0.04
0.03
0.02
0.01
0
Error
0
20
40
60
80
S


Crank-Nicolson. Max absolute Error vs N
Error
N
2.5
2
1.5
1
0.5
0
0
100
200
300
400