भारतीय प्रौद्योगिकी संस्थान गुवाहाटी
INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

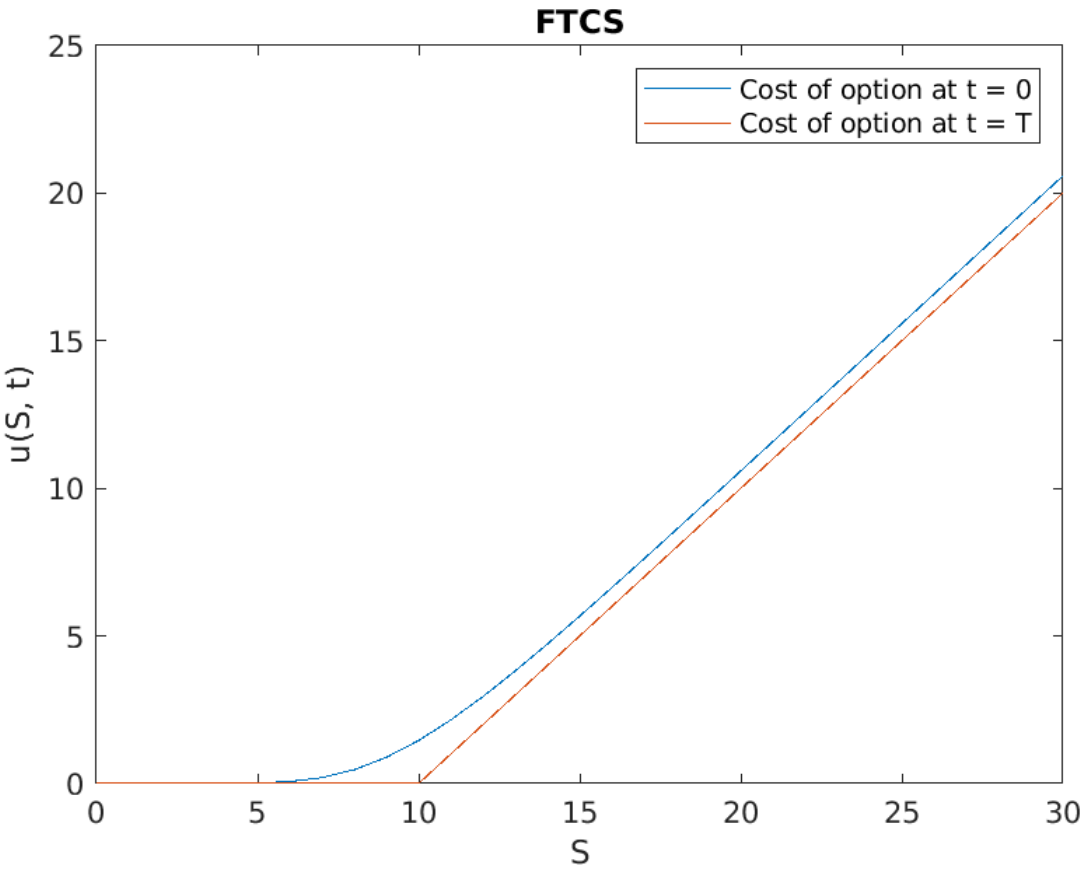
MA 473: Computational Finance Lab

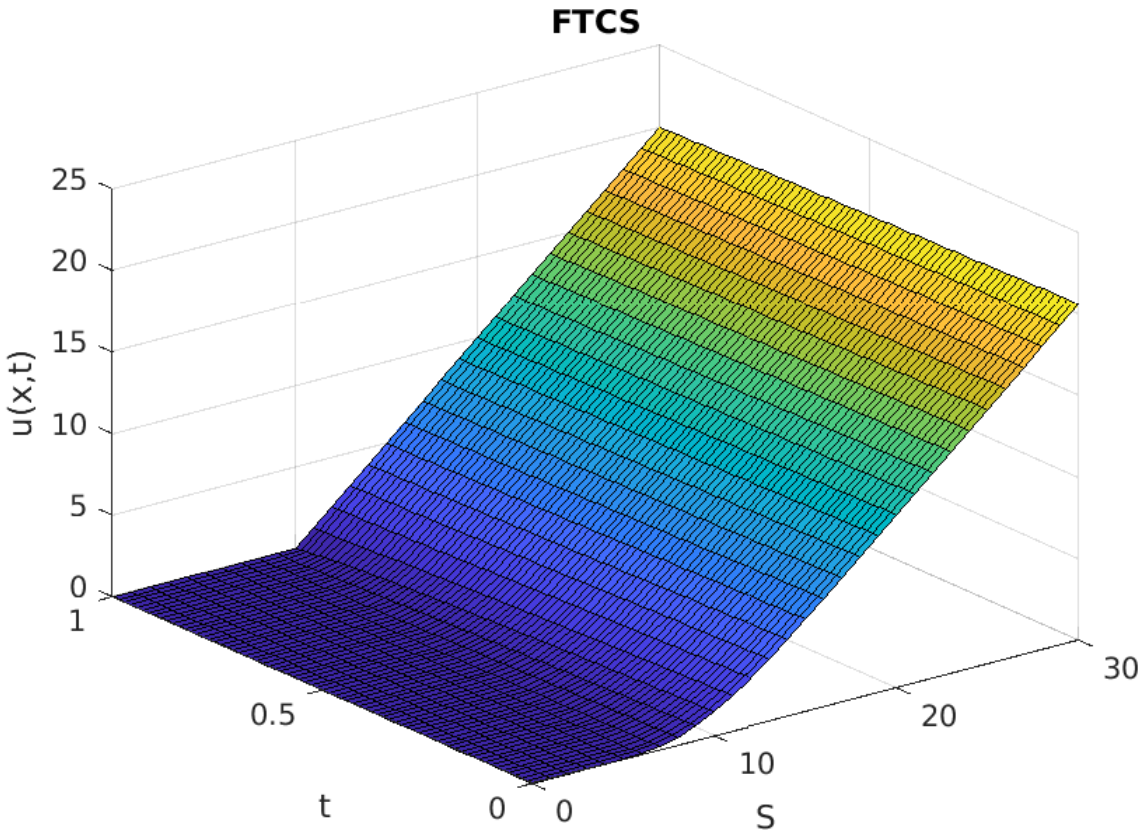
Lab 02

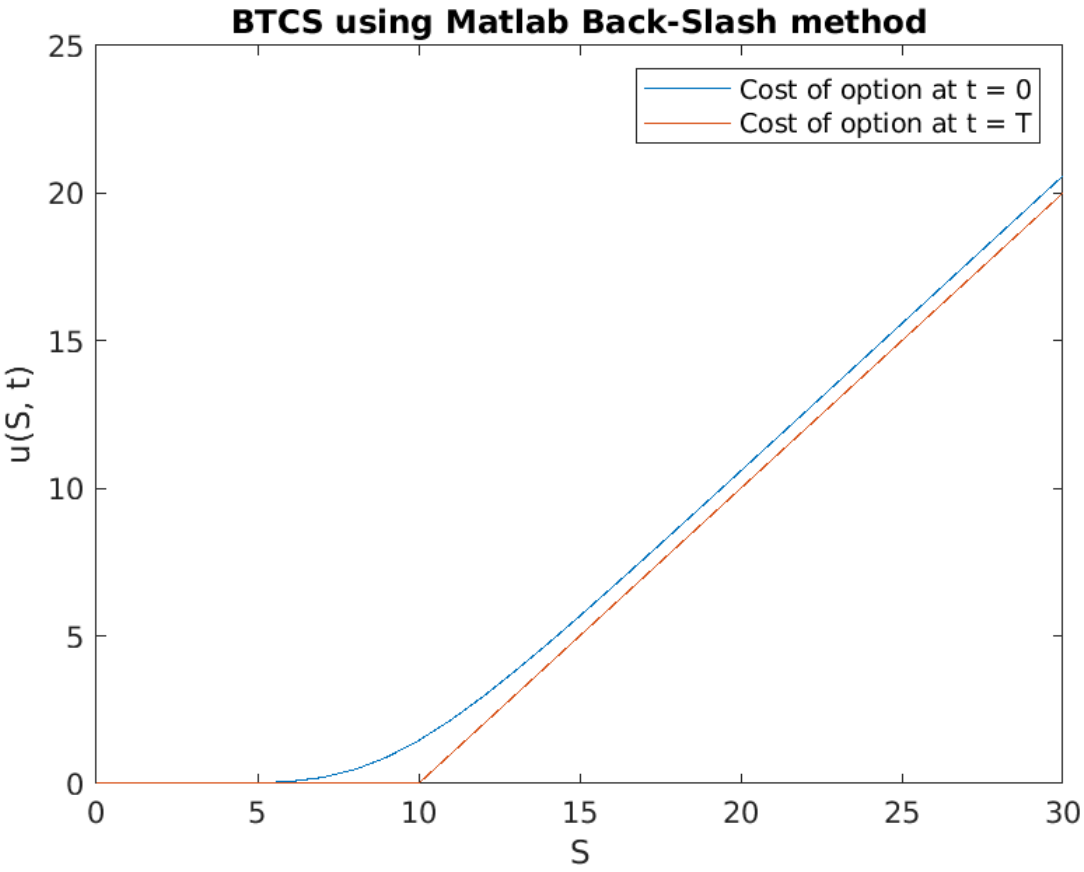
AB Satyaprakash (180123062)

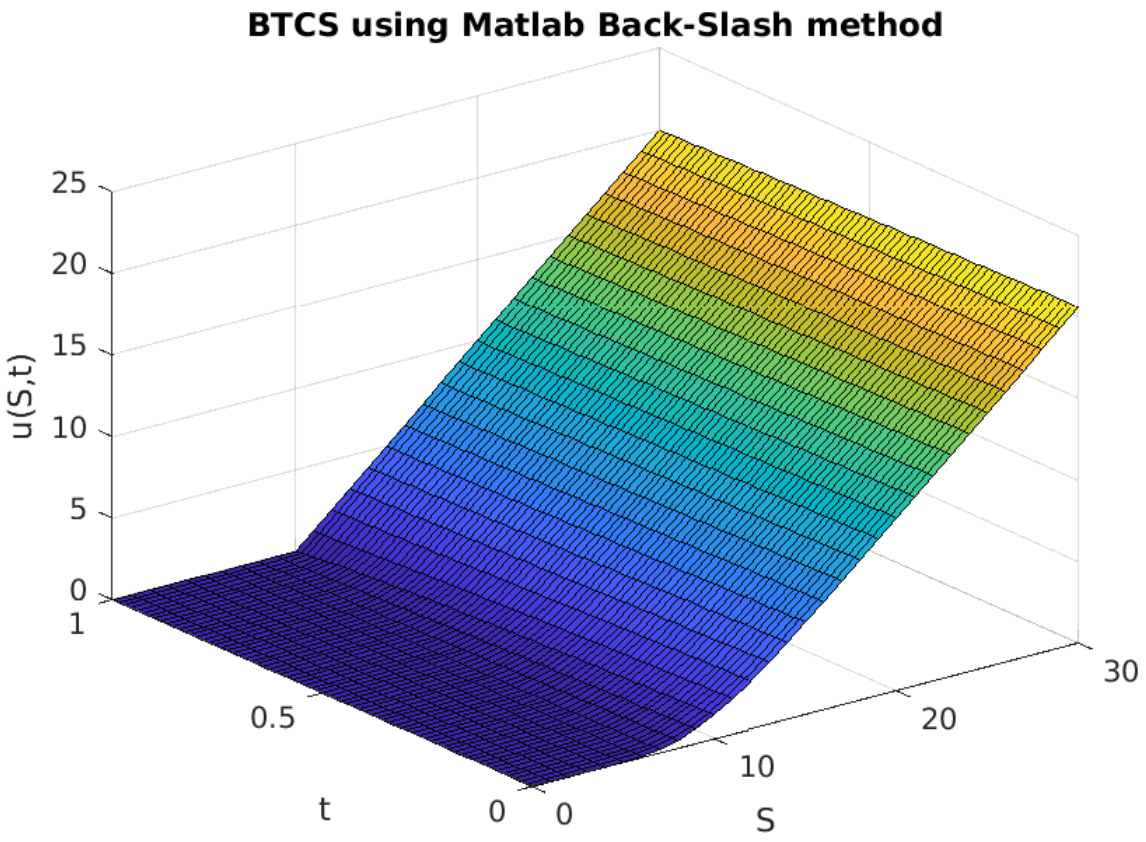
22 Aug 2021

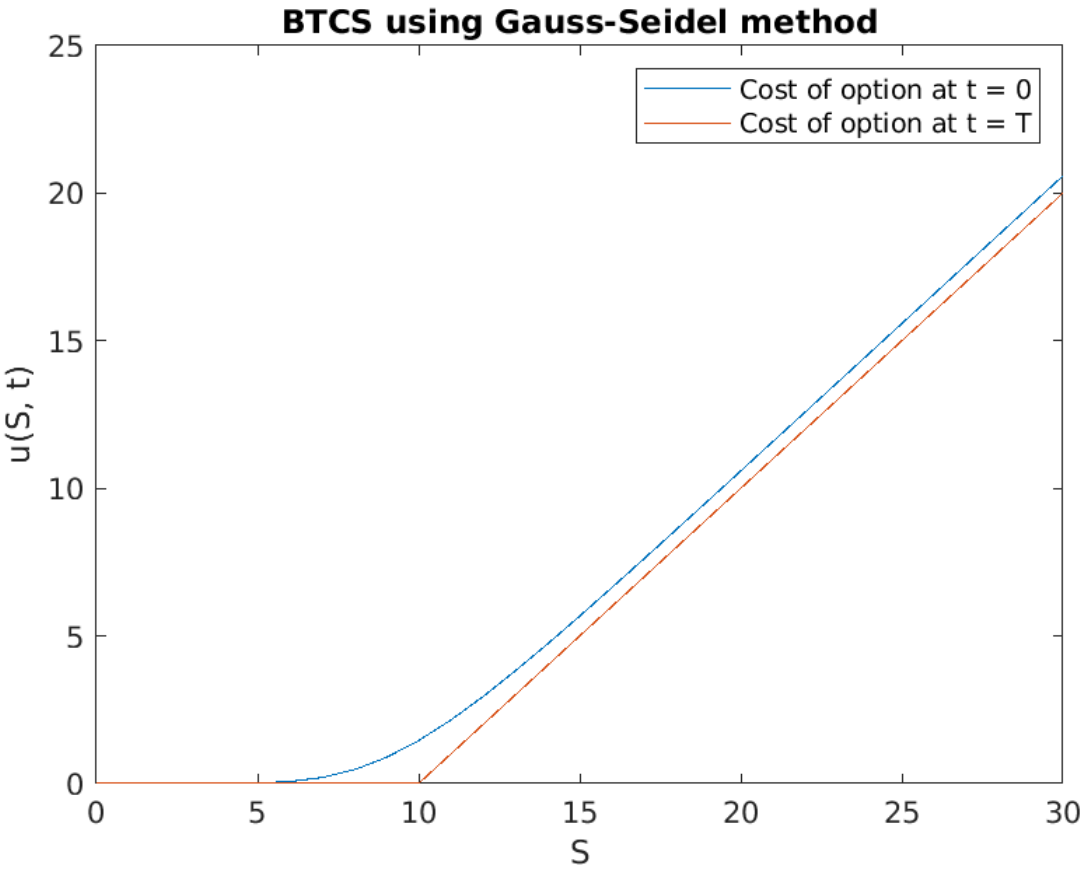
Question 01.

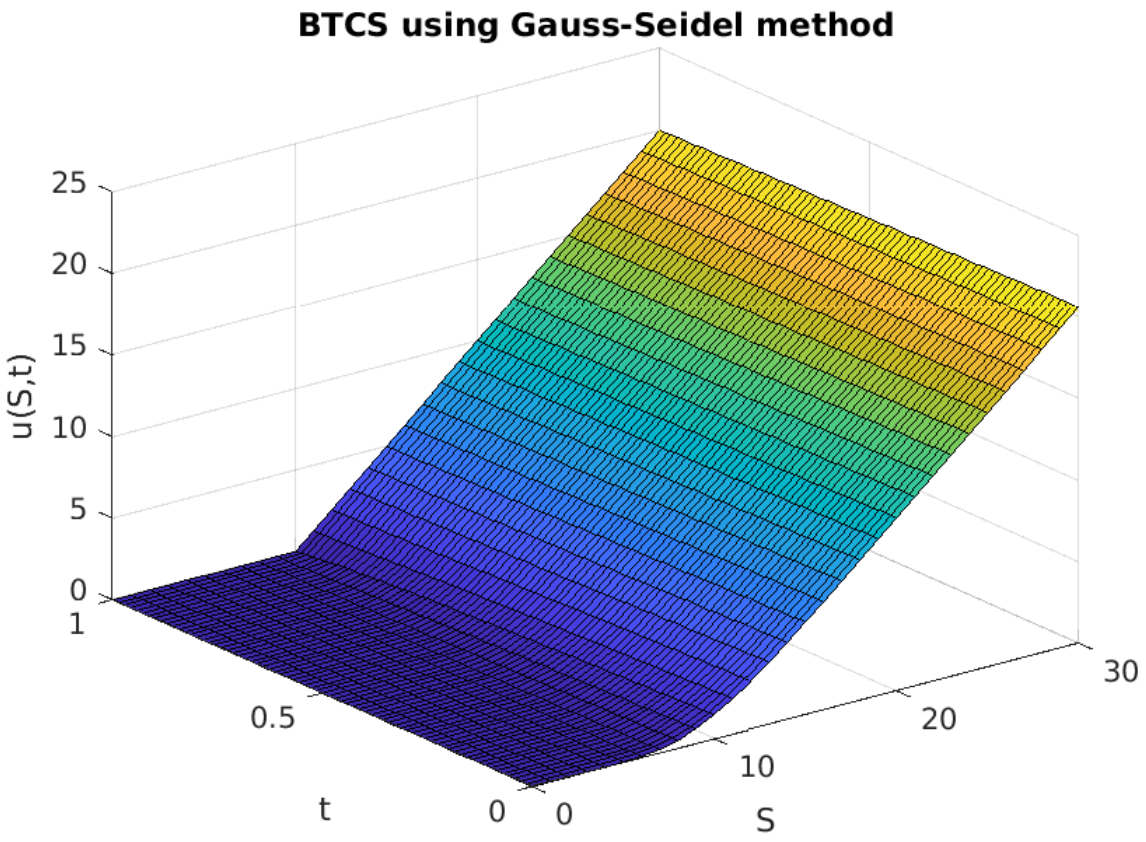

FTCS
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
5
10
15
20
25
30

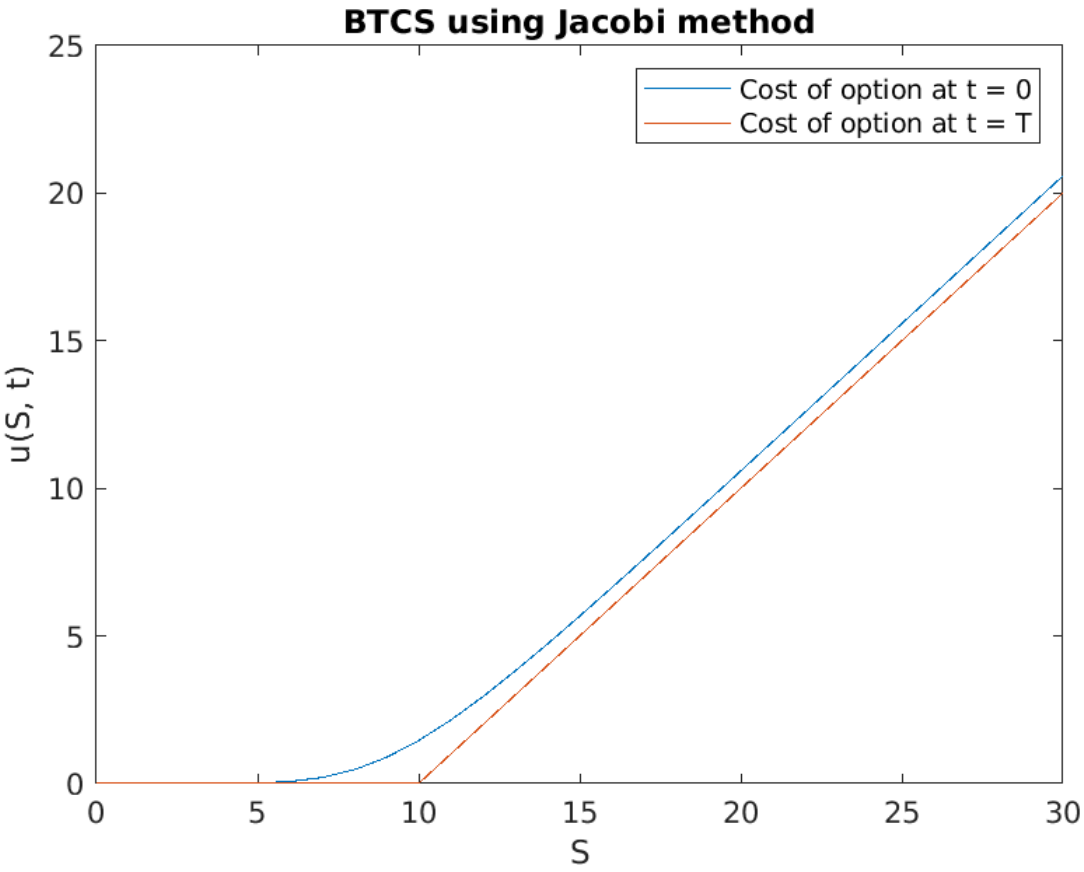

FTCS
u(x,t)
25
20
15
10
5
0
1
0.5
t
0
0
10
20
30
S

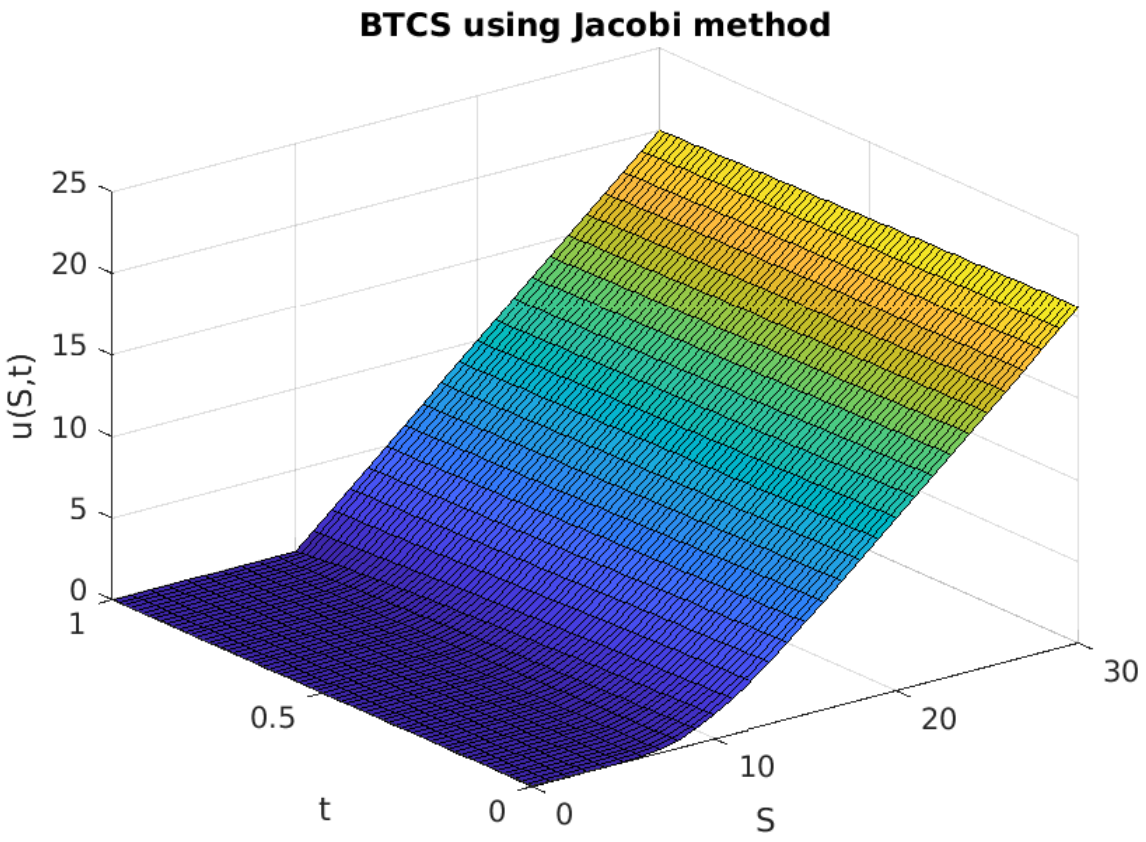

BTCS using Matlab Back-Slash method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
5
10
15
20
25
30

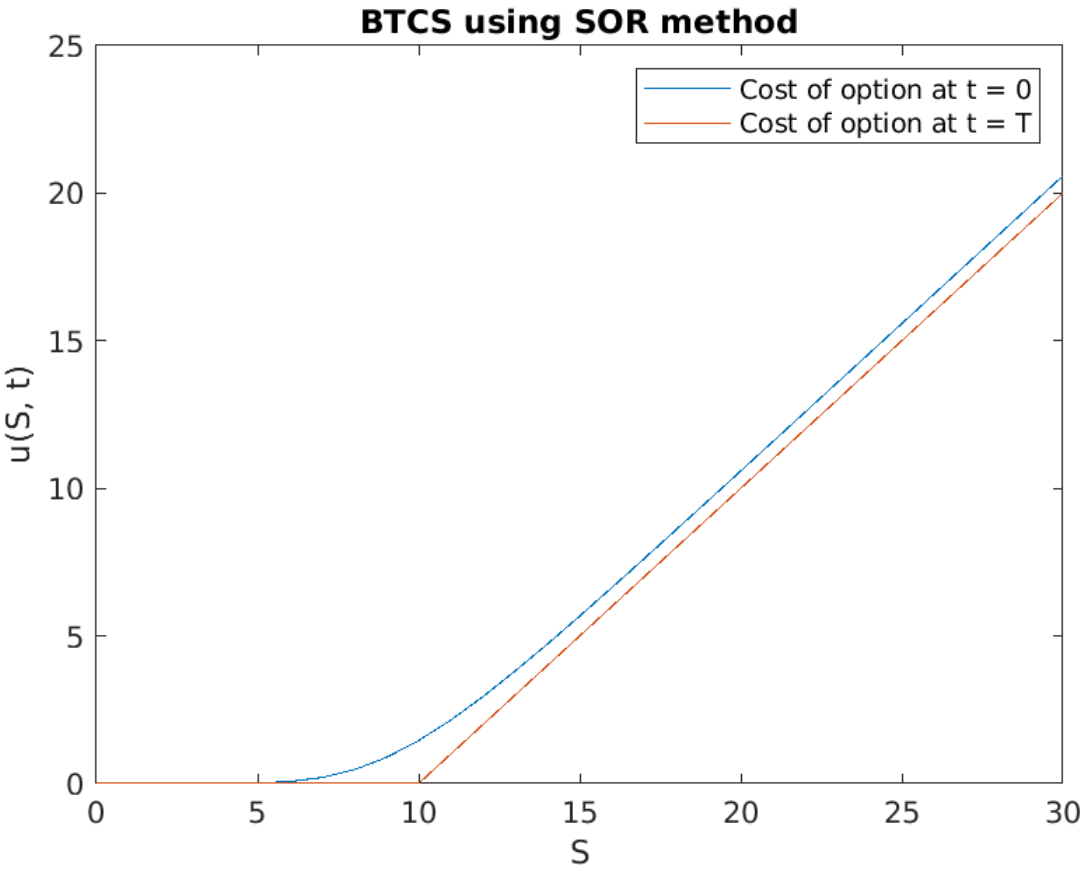

BTCS using Matlab Back-Slash method
u(S,t)
25
20
15
10
5
0
1
0.5
t
0
0
10
20
30
S

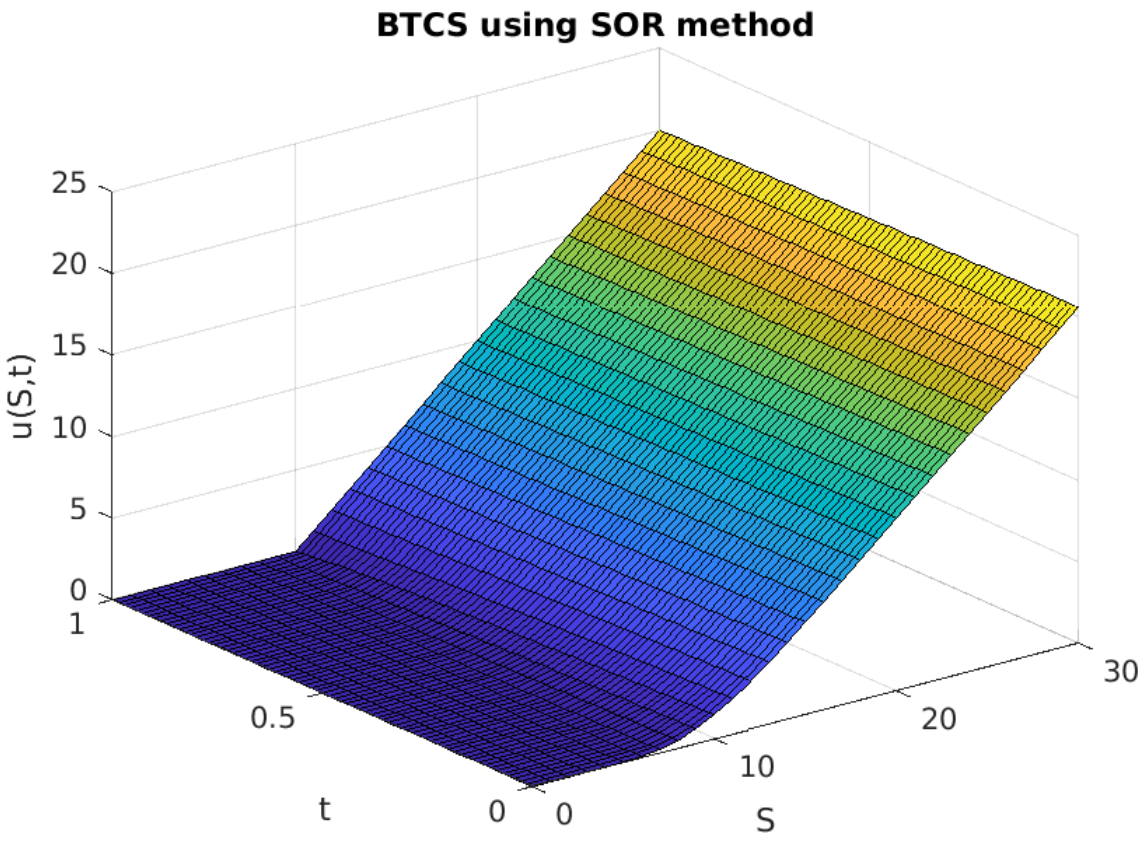

BTCS using Gauss-Seidel method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
5
10
15
20
25
30

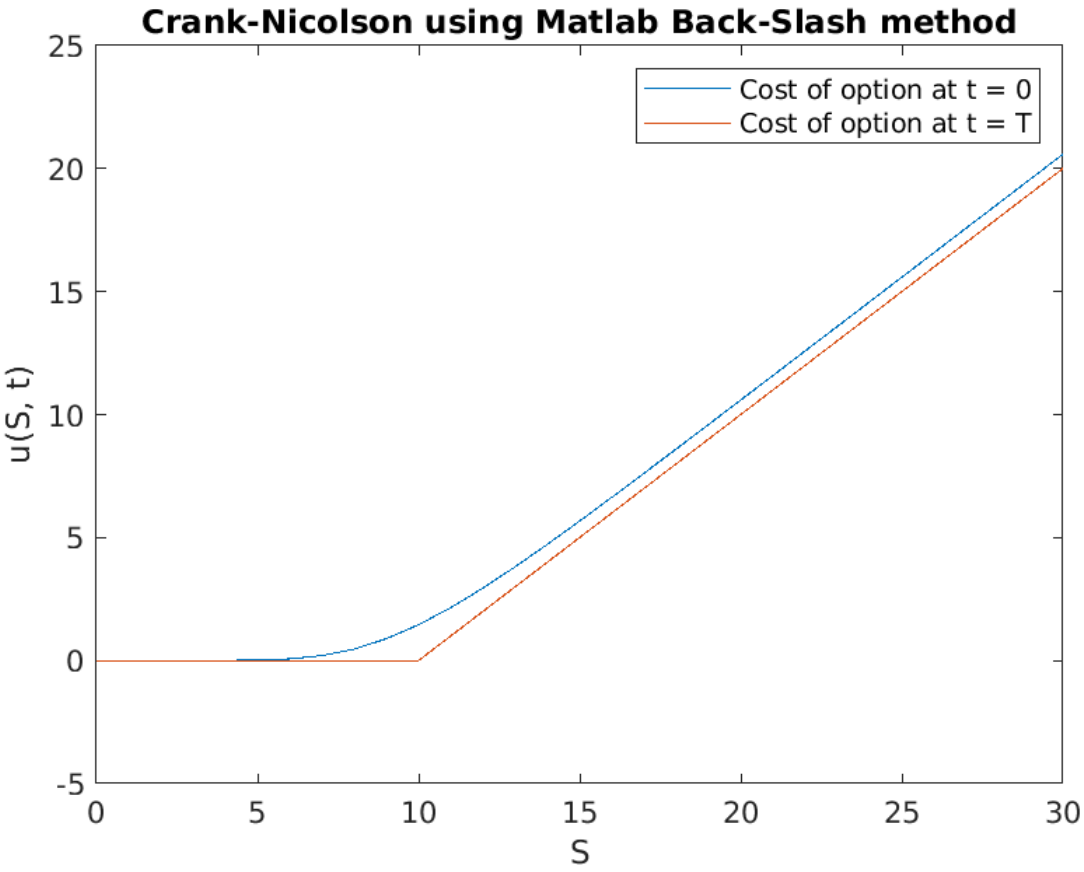

BTCS using Gauss-Seidel method
u(S,t)
25
20
15
10
5
0
1
0.5
t
0
0
10
20
30
S

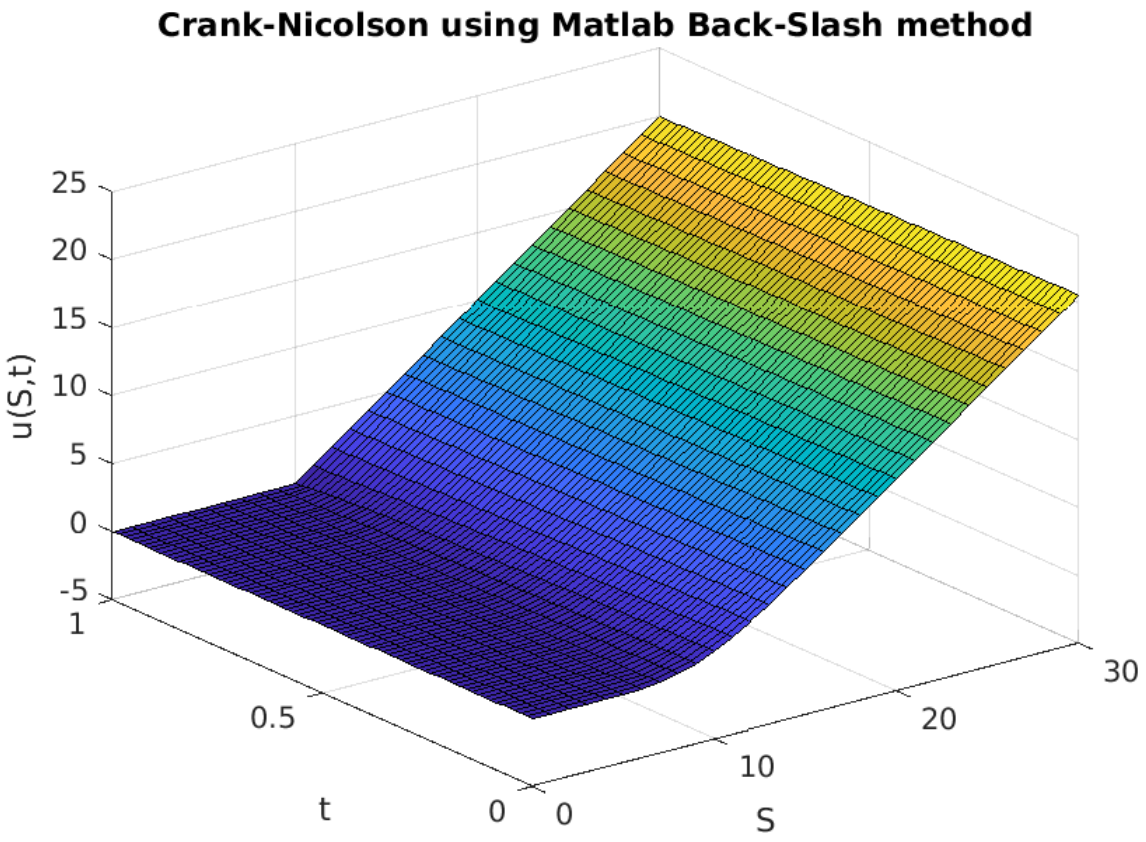

BTCS using Jacobi method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
5
10
15
20
25
30

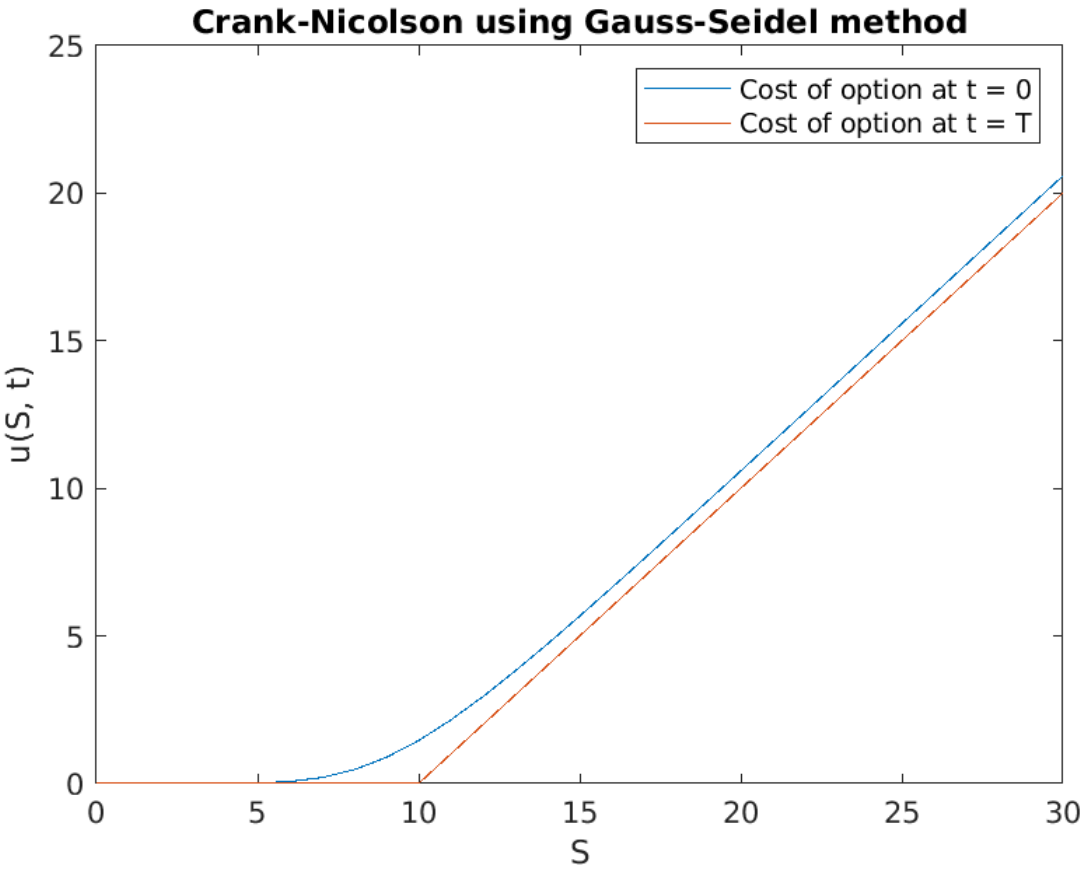

BTCS using Jacobi method
u(S,t)
25
20
15
10
5
0
1
0.5
t
0
0
10
20
30
S

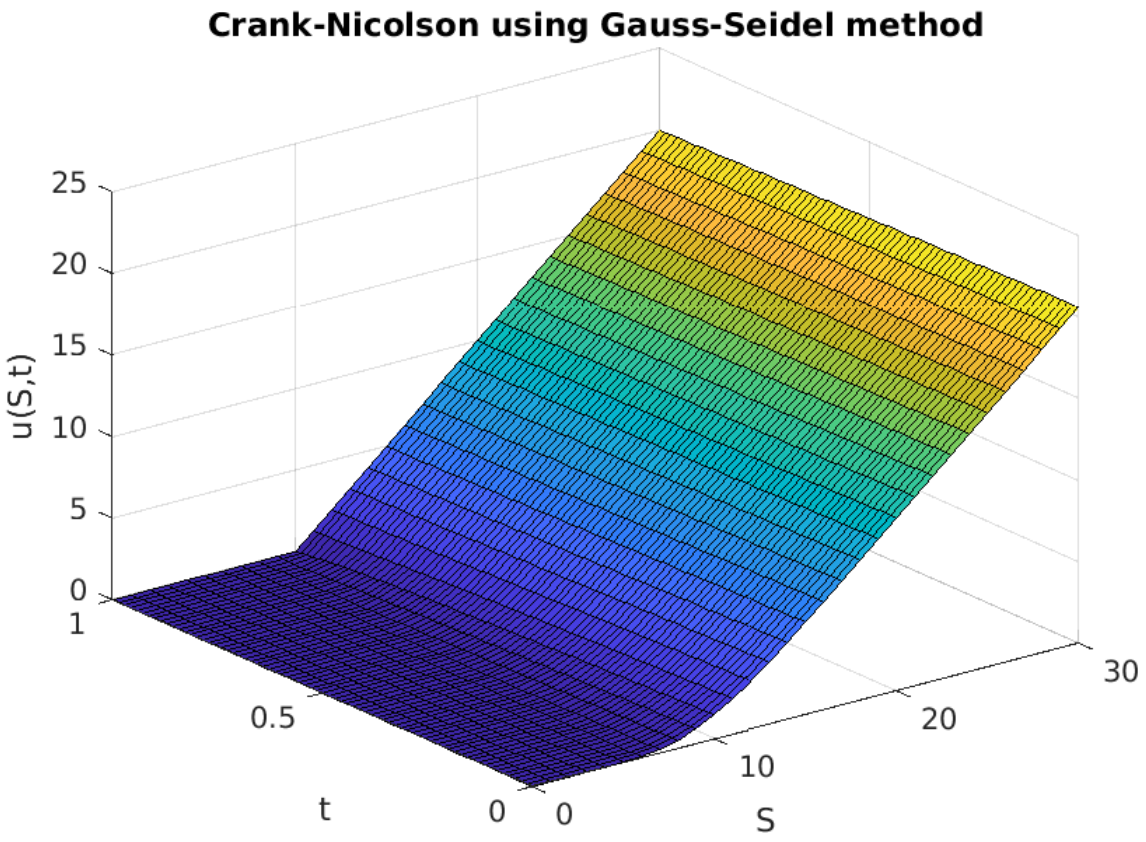

BTCS using SOR method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
5
10
15
20
25
30

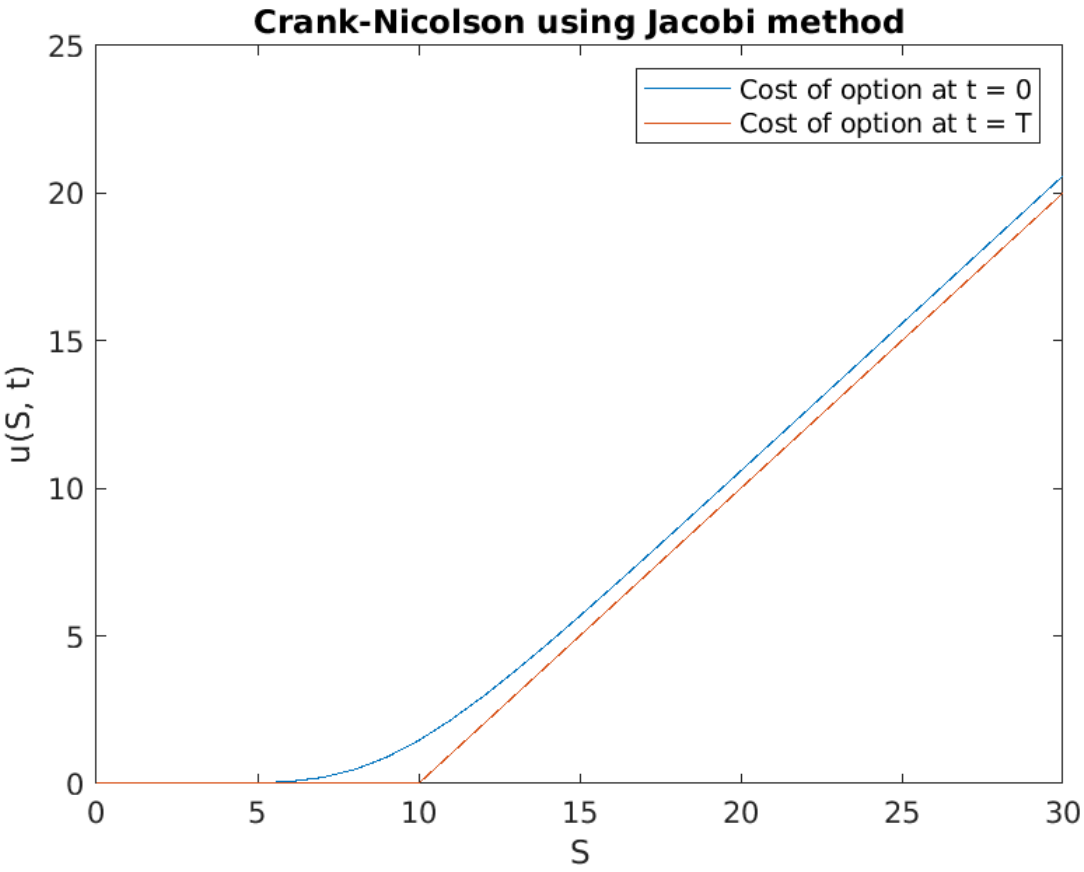

BTCS using SOR method
u(S,t)
25
20
15
10
5
0
1
0.5
t
0
0
10
20
30
S

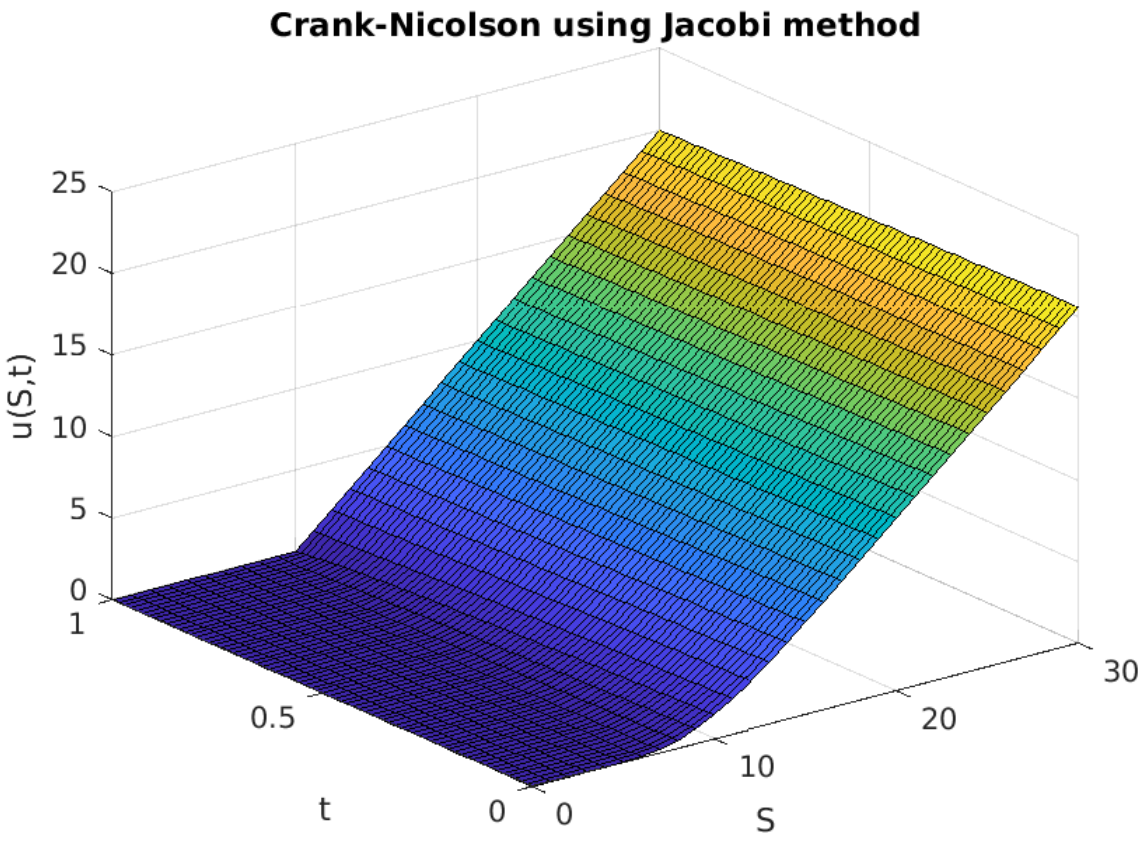

Crank-Nicolson using Matlab Back-Slash method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
25
20
15
10
5
0
-5
0
5
10
15
20
25
30

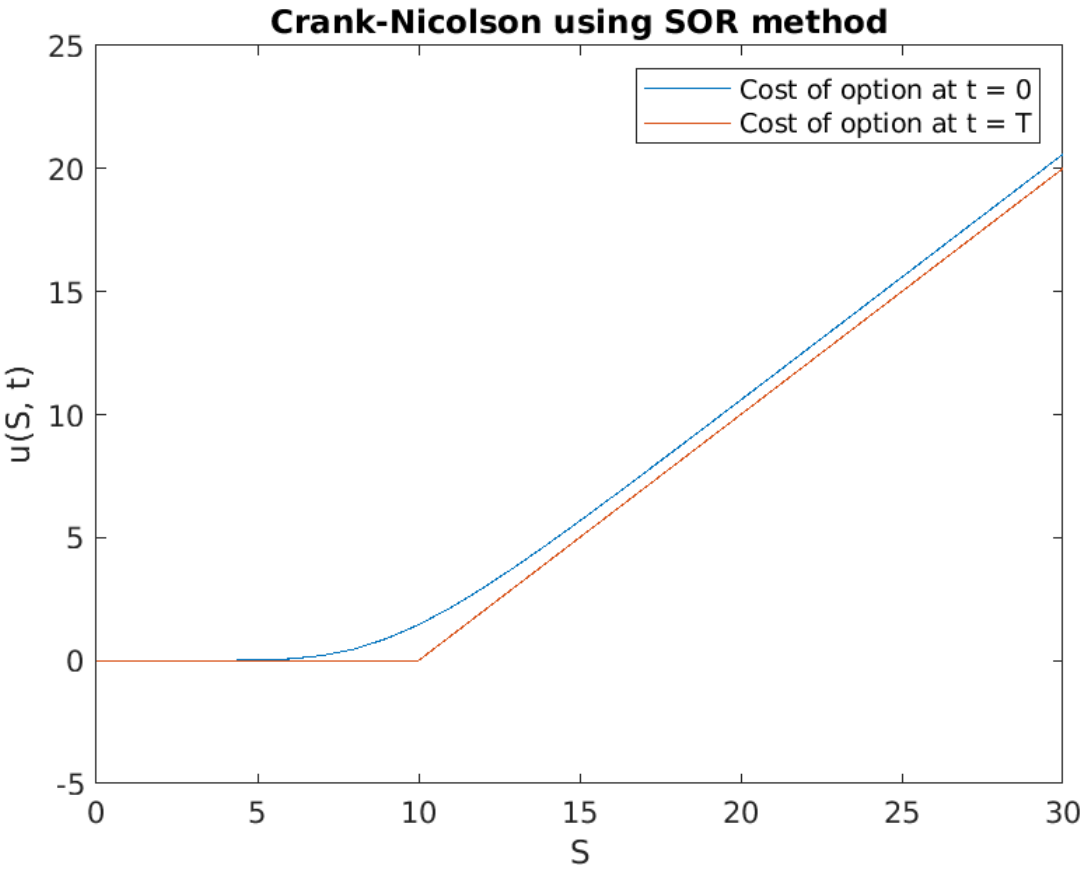

Crank-Nicolson using Matlab Back-Slash method
u(S,t)
25
20
15
10
5
0
-5
1
0.5
t
0
0
10
20
30
S

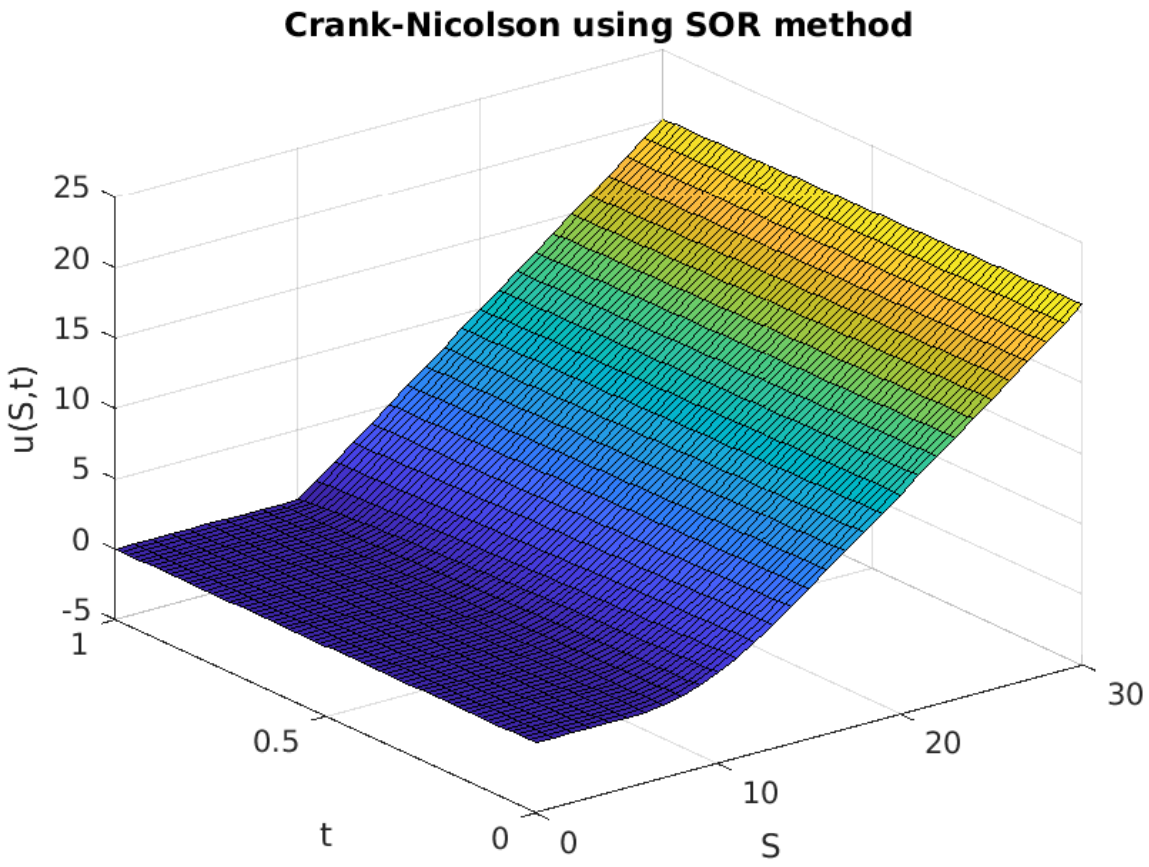

Crank-Nicolson using Gauss-Seidel method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
5
10
15
20
25
30


Crank-Nicolson using Gauss-Seidel method
u(S,t)
25
20
15
10
5
0
1
0.5
t
0
0
10
20
30
S

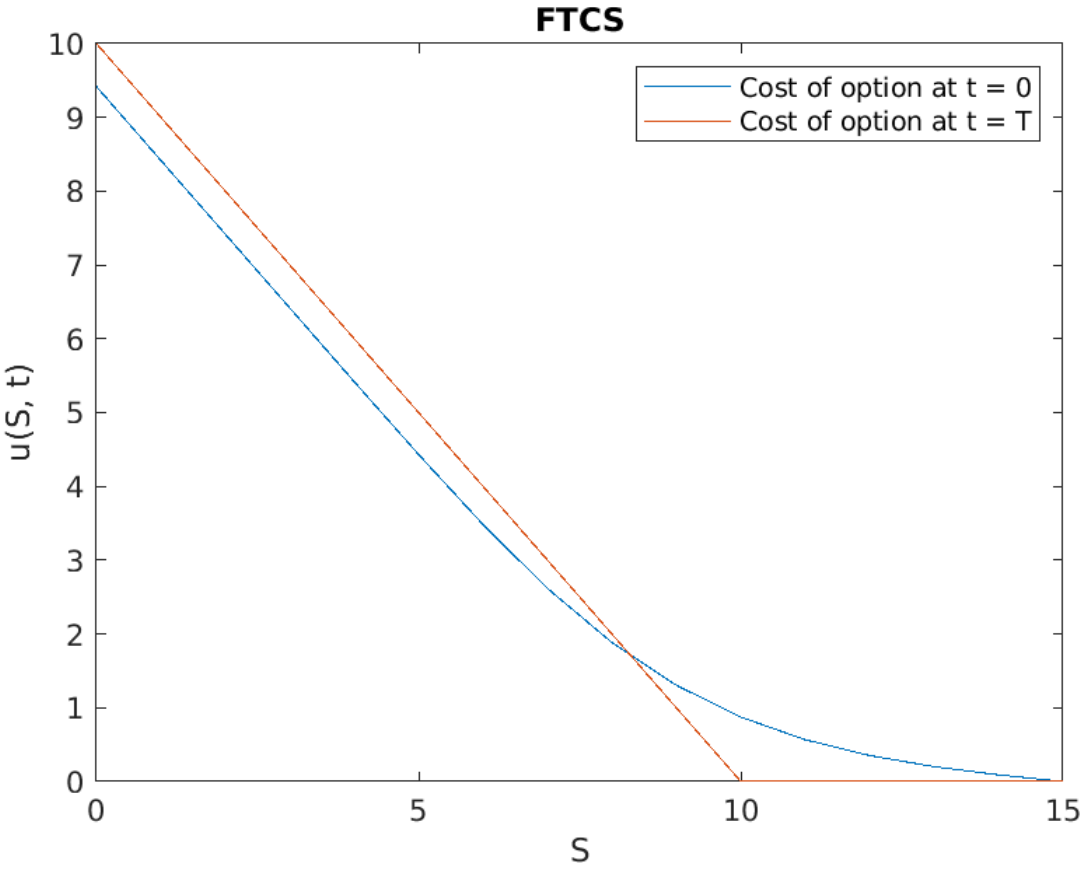

Crank-Nicolson using Jacobi method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
5
10
15
20
25
30

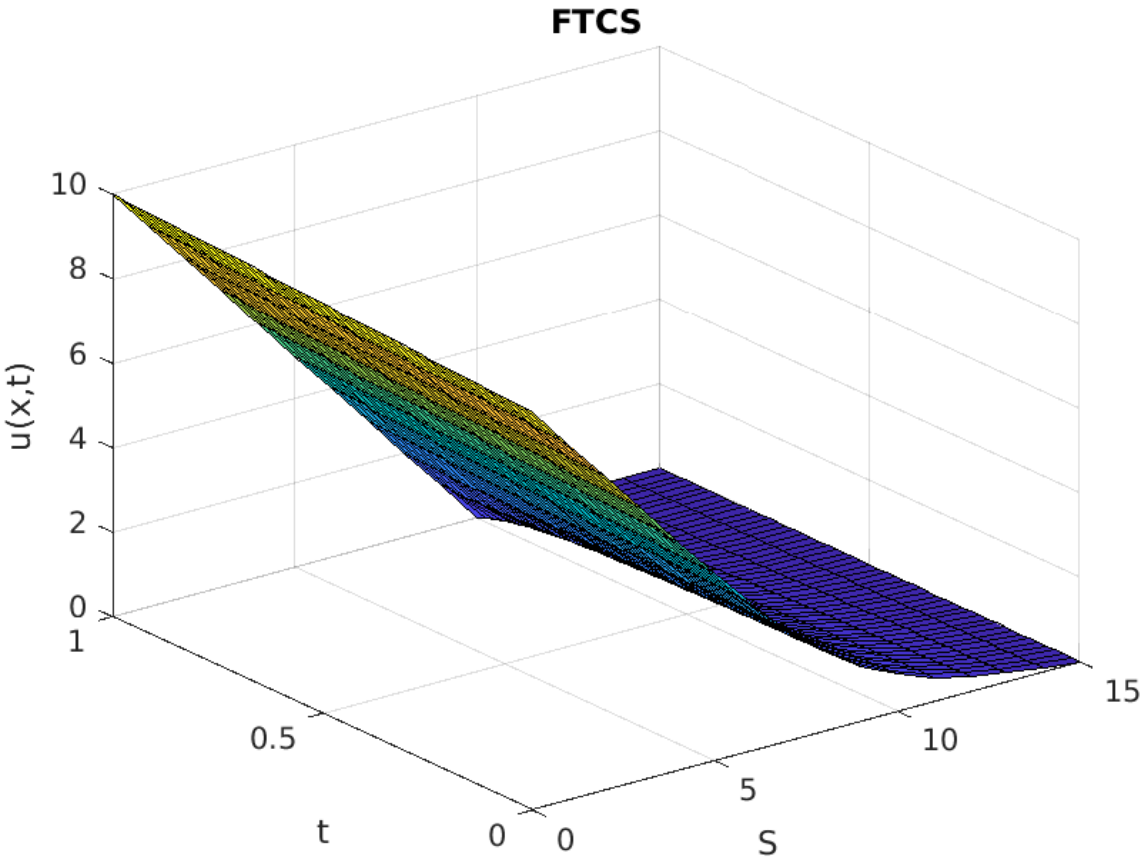

Crank-Nicolson using Jacobi method
u(S,t)
25
20
15
10
5
0
1
0.5
t
0
0
10
20
30
S

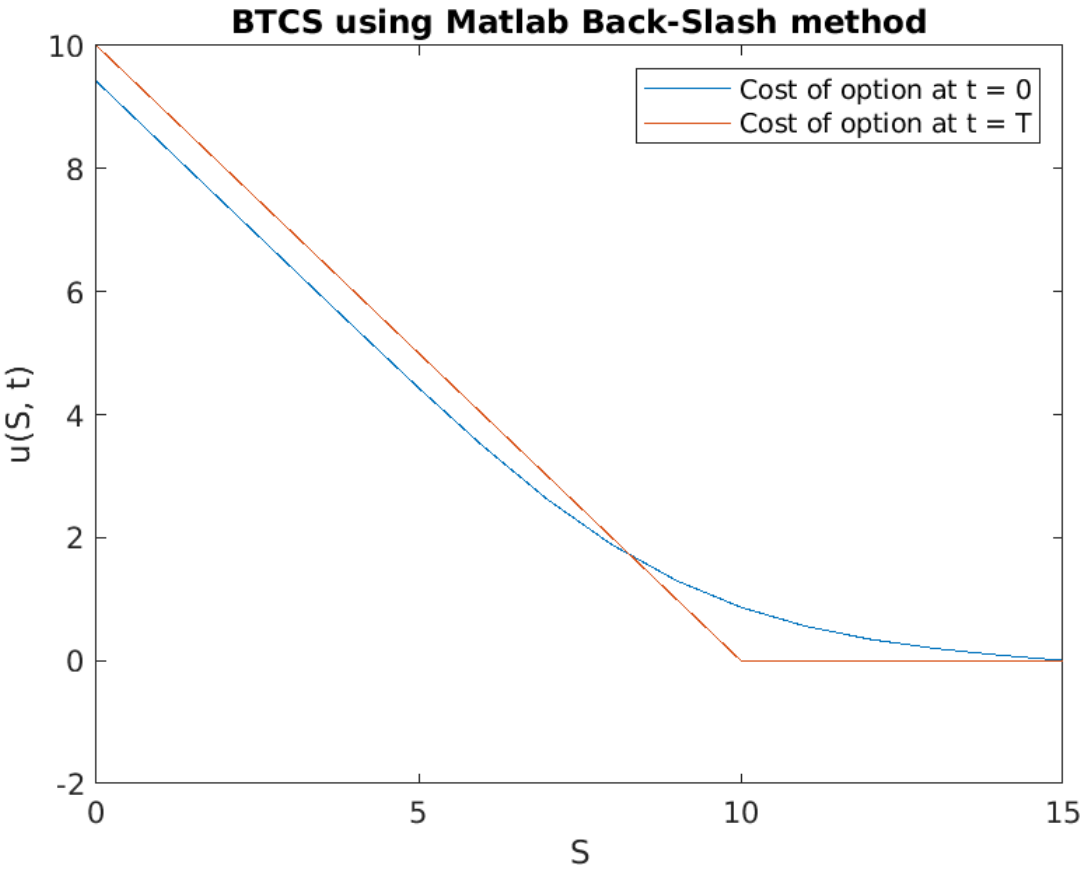

Crank-Nicolson using SOR method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
25
20
15
10
5
0
-5
0
5
10
15
20
25
30

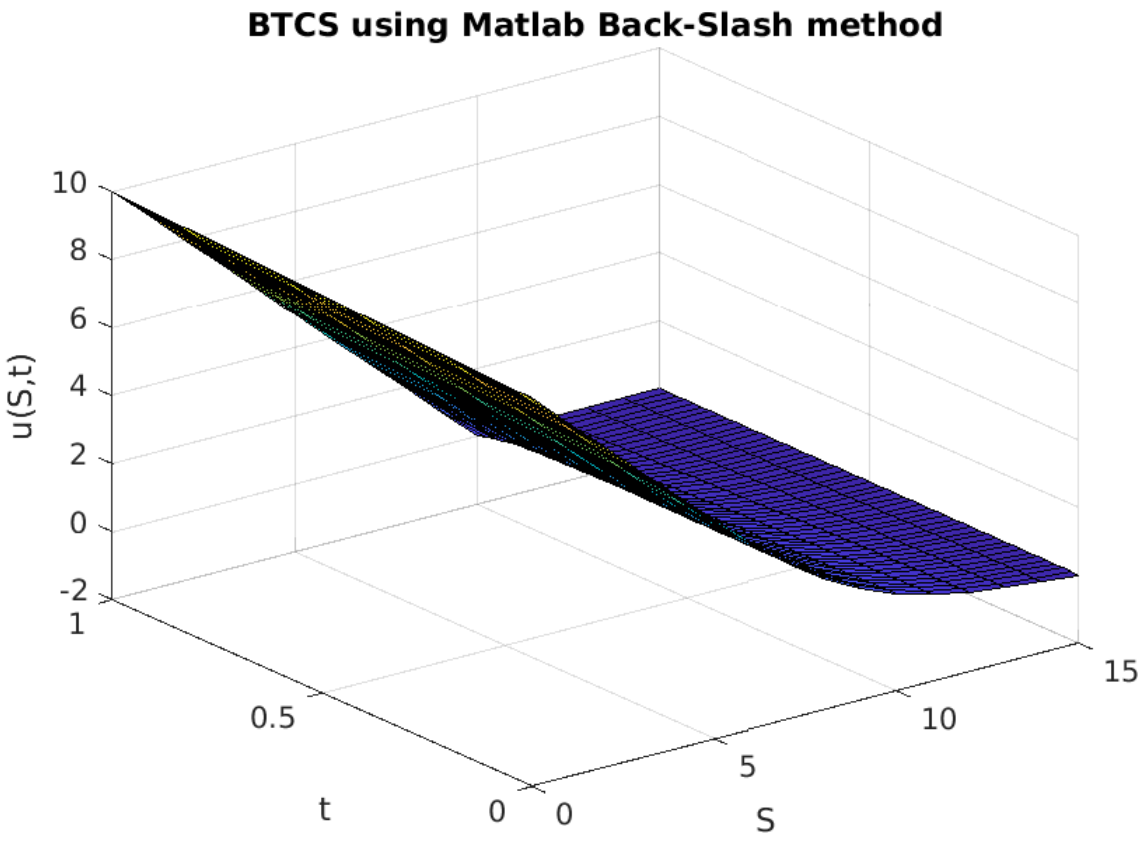

Crank-Nicolson using SOR method
u(S,t)
25
20
15
10
5
0
-5
1
0.5
t
0
0
10
20
30
S

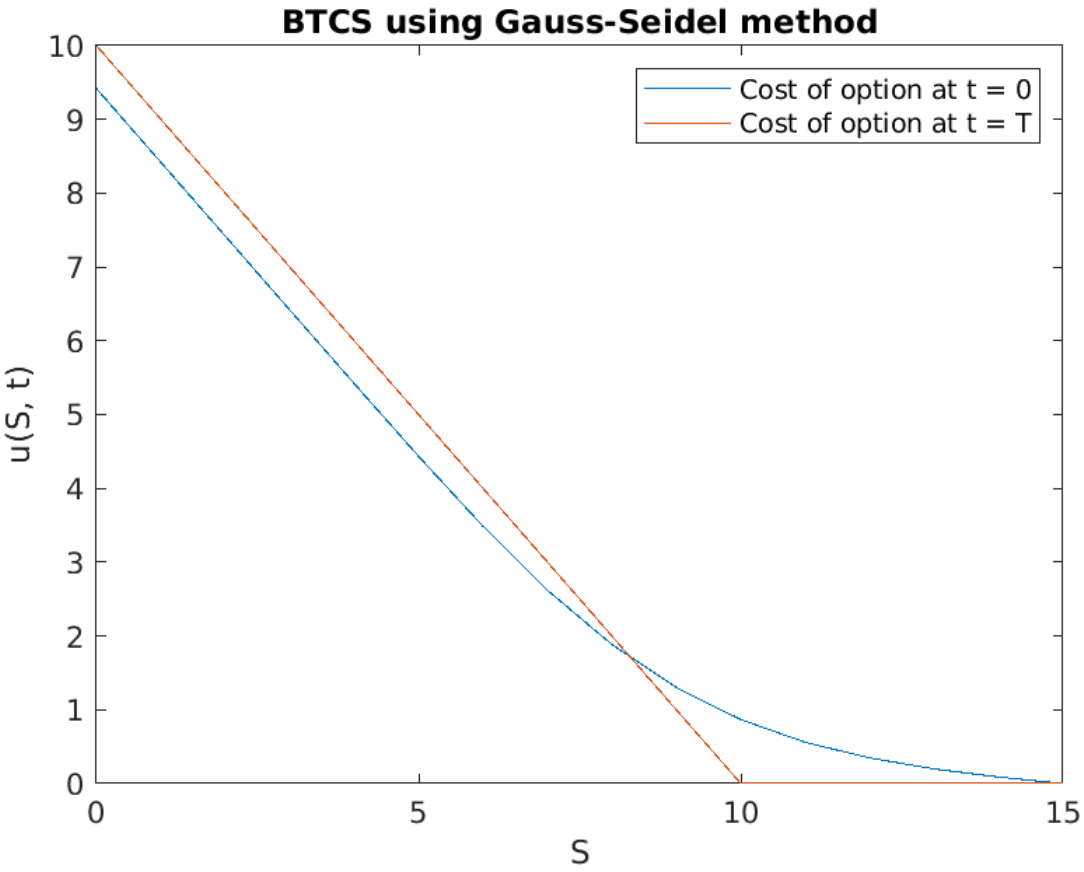
Question 02.

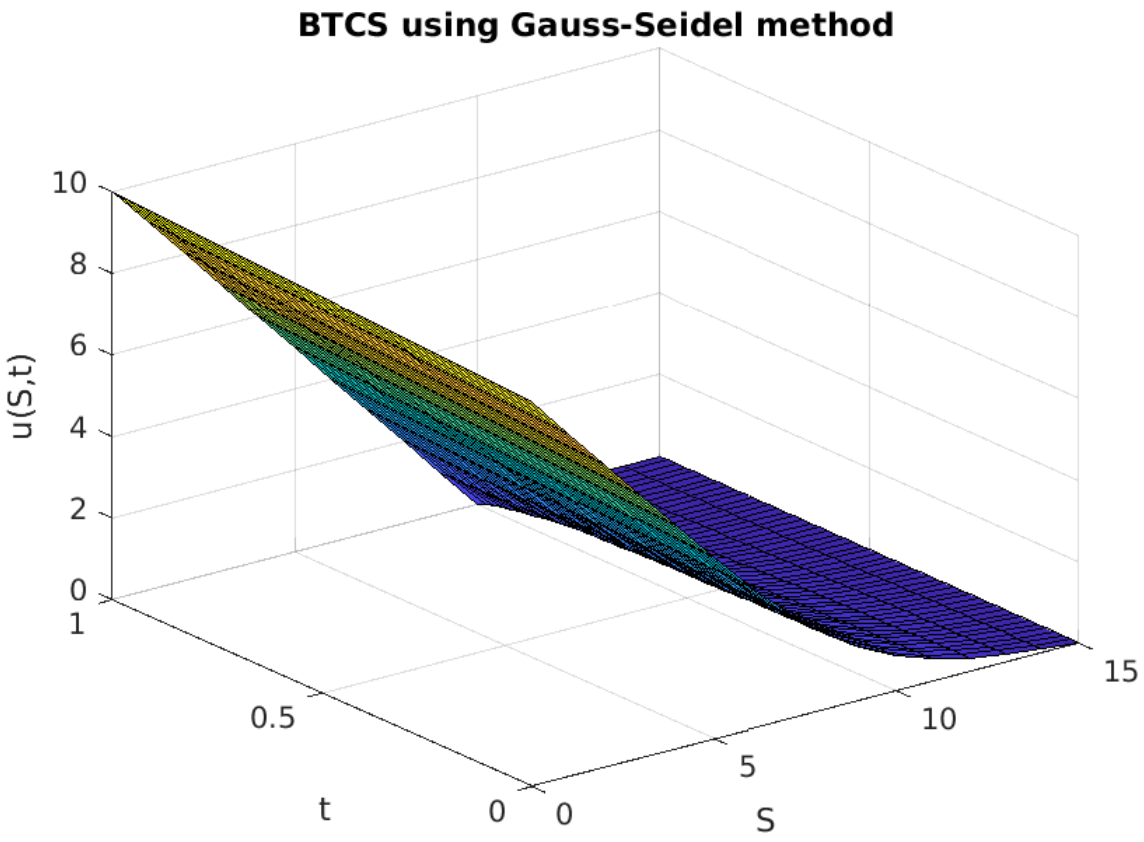

FTCS
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15

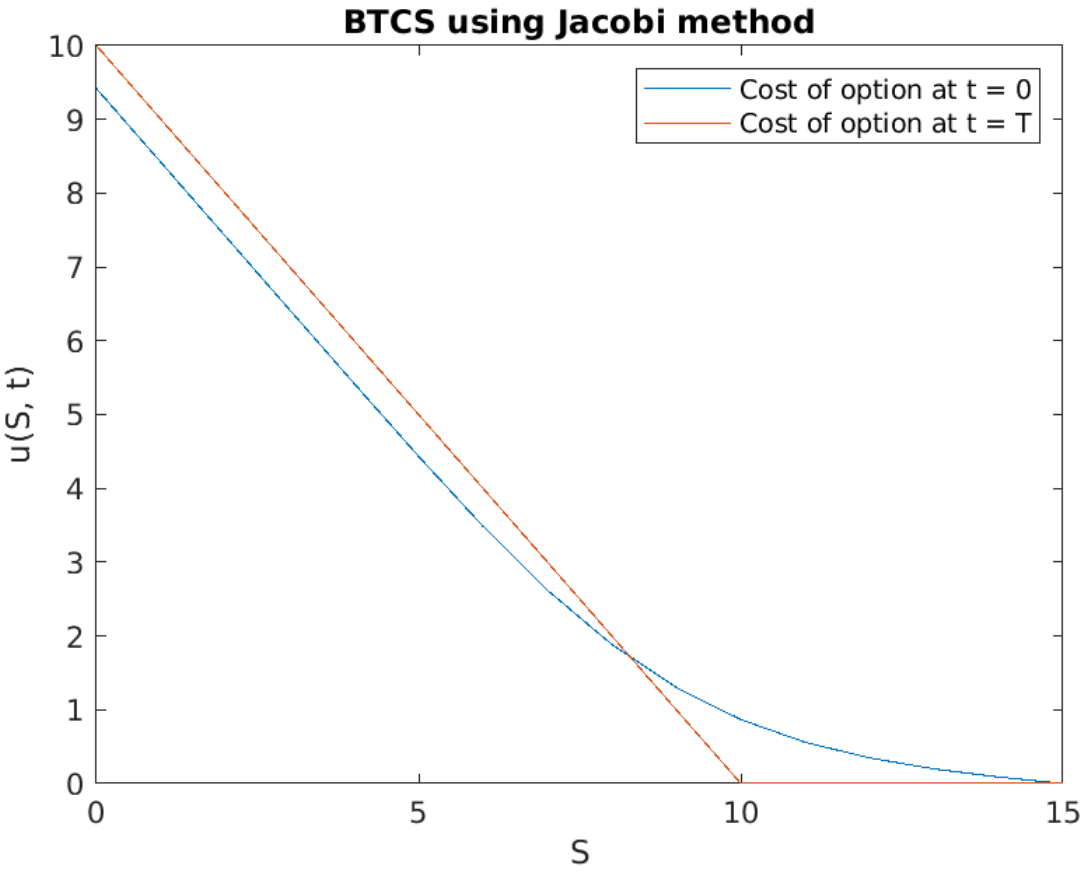

FTCS
u(x,t)
10
8
6
4
2
0
1
0.5
t
0
0
5
10
15
S

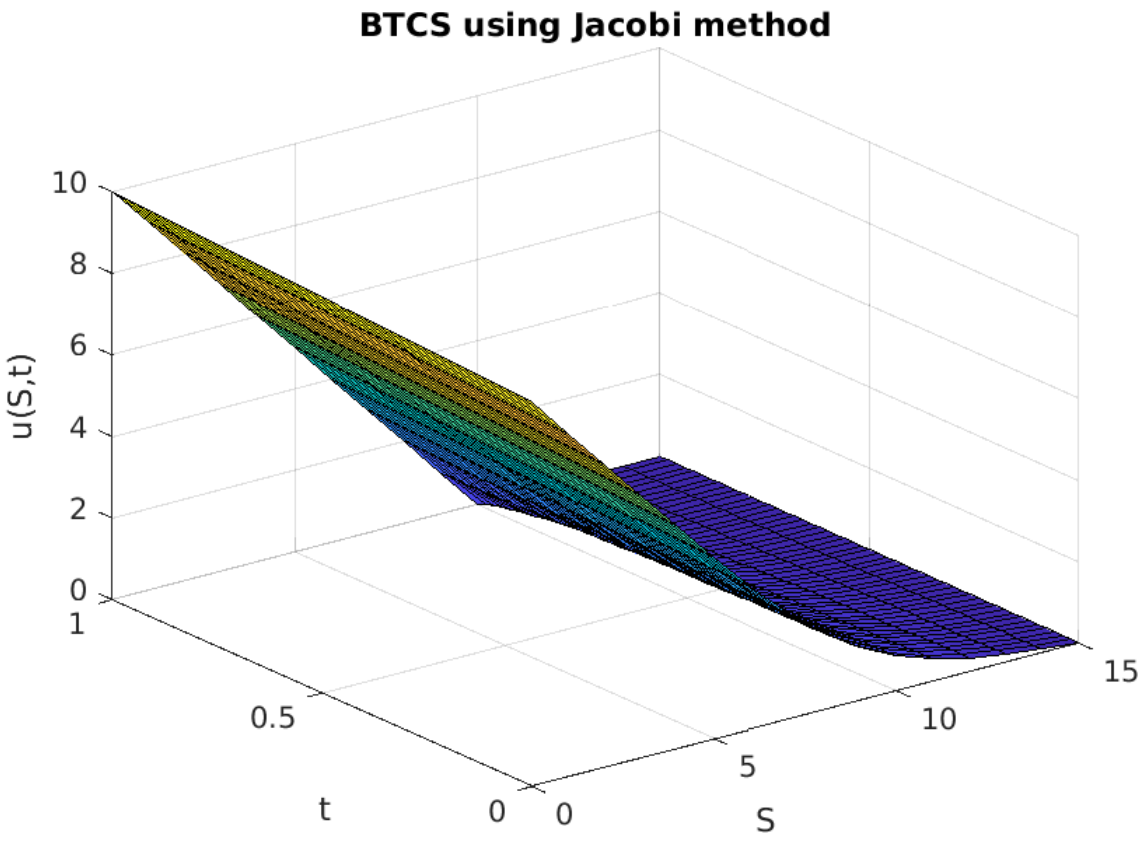

BTCS using Matlab Back-Slash method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
10
8
6
4
2
0
-2
0
5
10
15

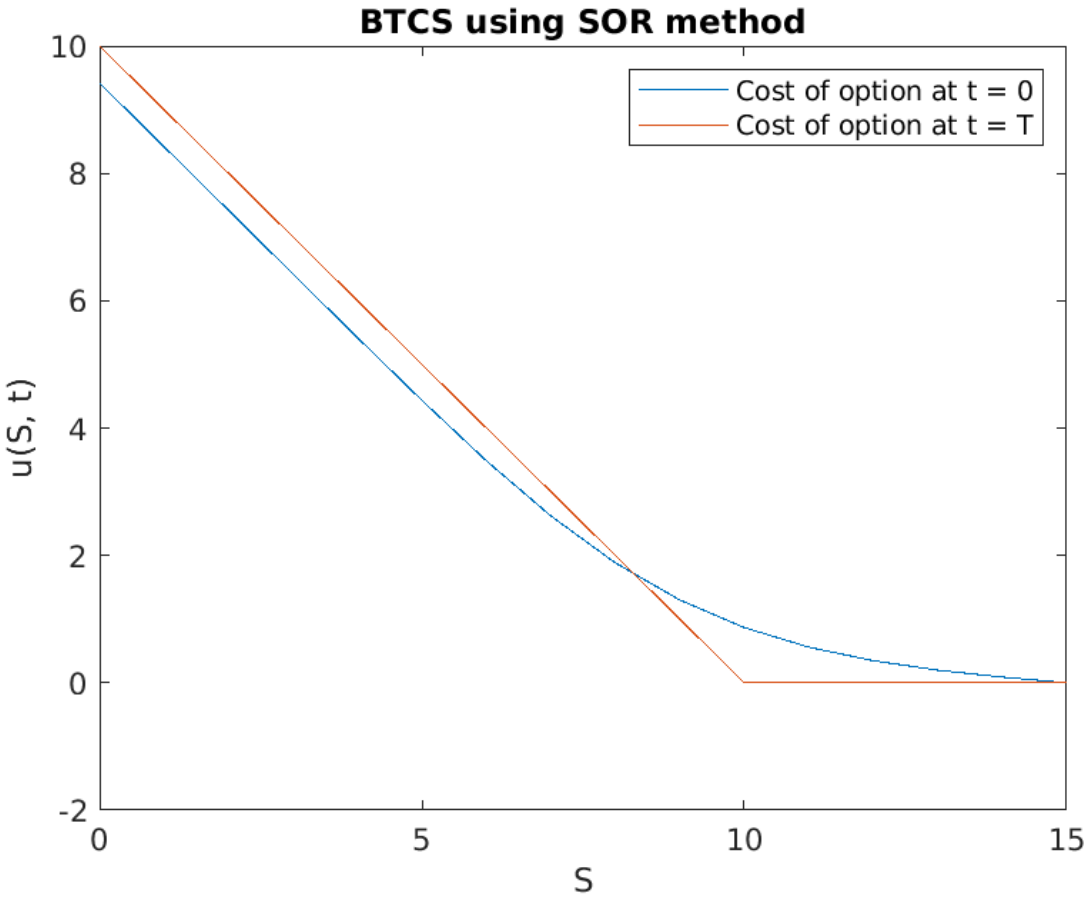

BTCS using Matlab Back-Slash method
u(S,t)
10
8
6
4
2
0
-2
1
0.5
t
0
0
5
10
15
S

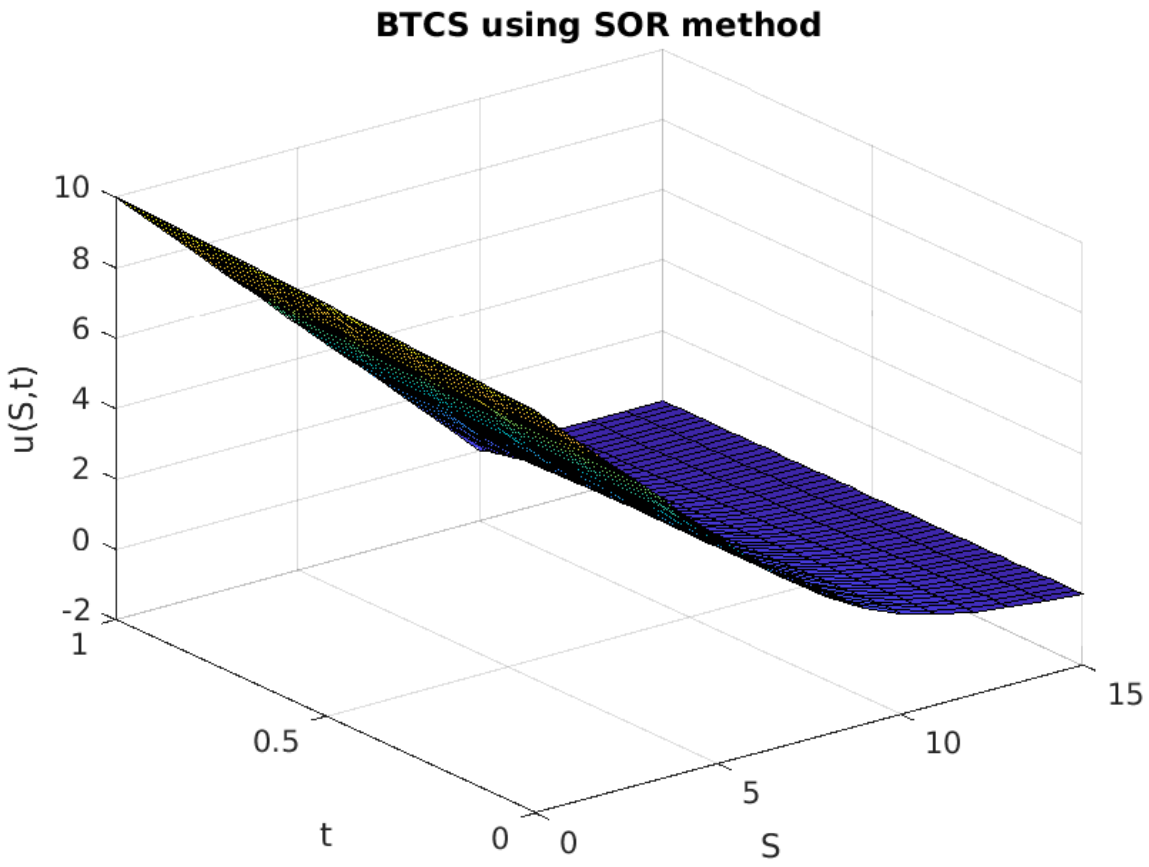

BTCS using Gauss-Seidel method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15

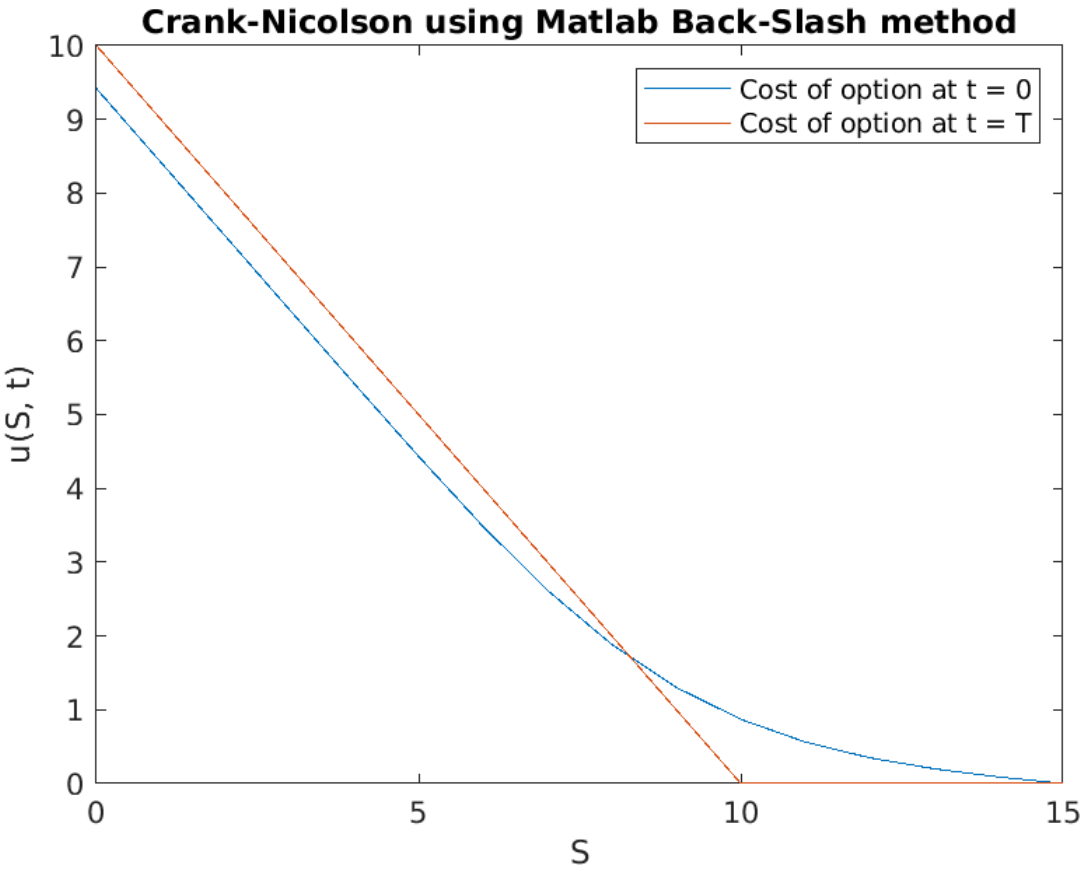

BTCS using Gauss-Seidel method
u(S,t)
10
8
6
4
2
0
1
0.5
t
0
0
5
10
15
S

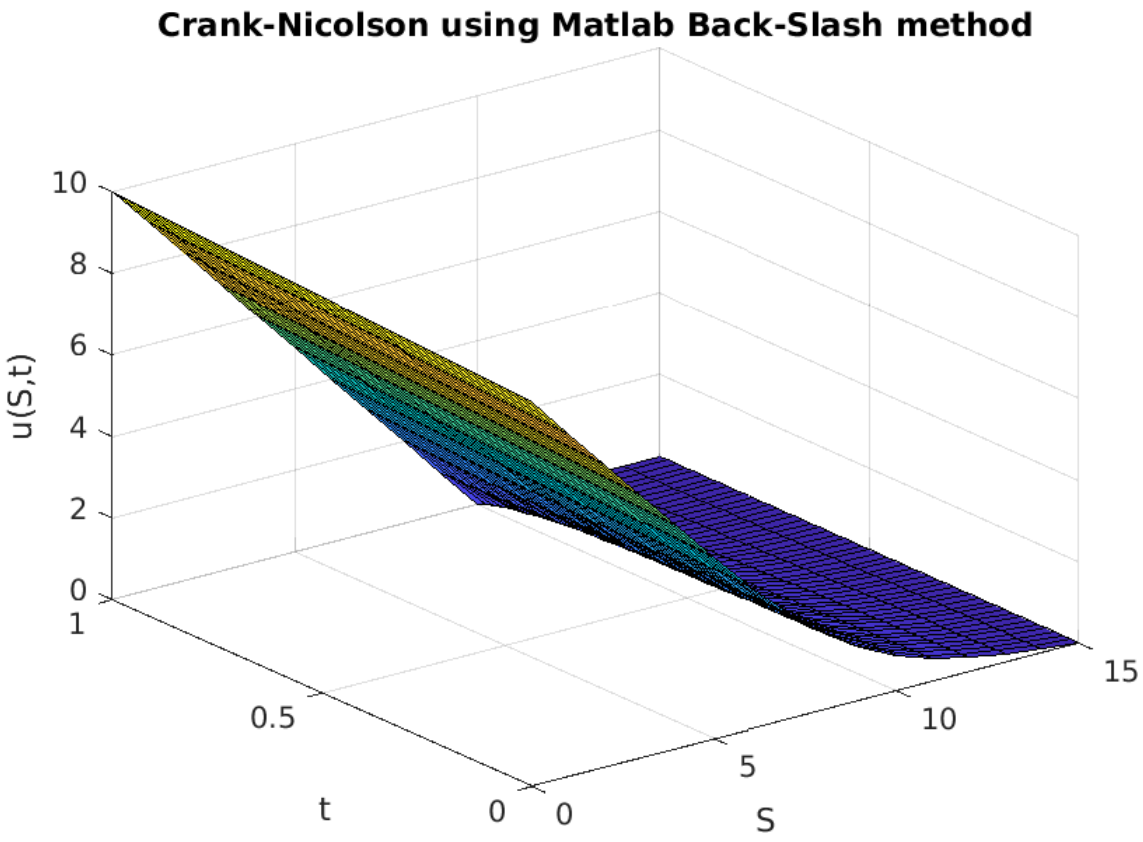

BTCS using Jacobi method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15

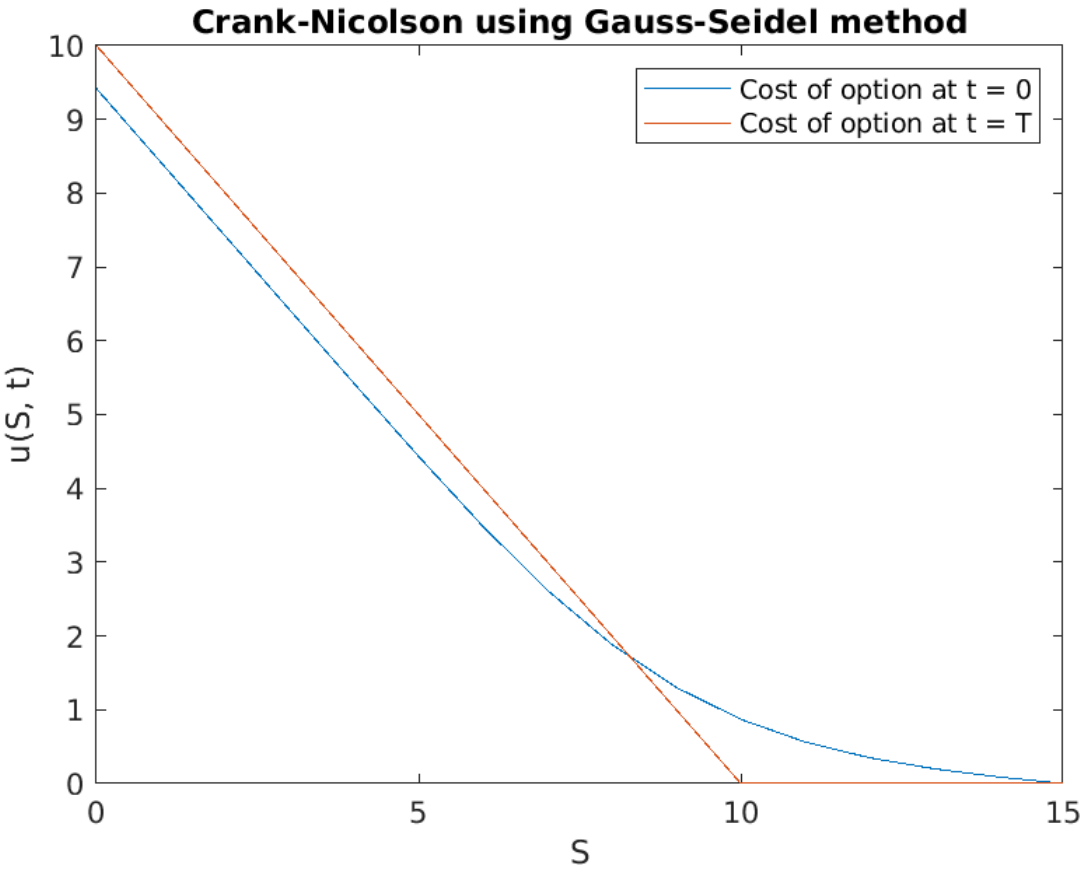

BTCS using Jacobi method
u(S,t)
10
8
6
4
2
0
1
0.5
t
0
0
5
10
15
S

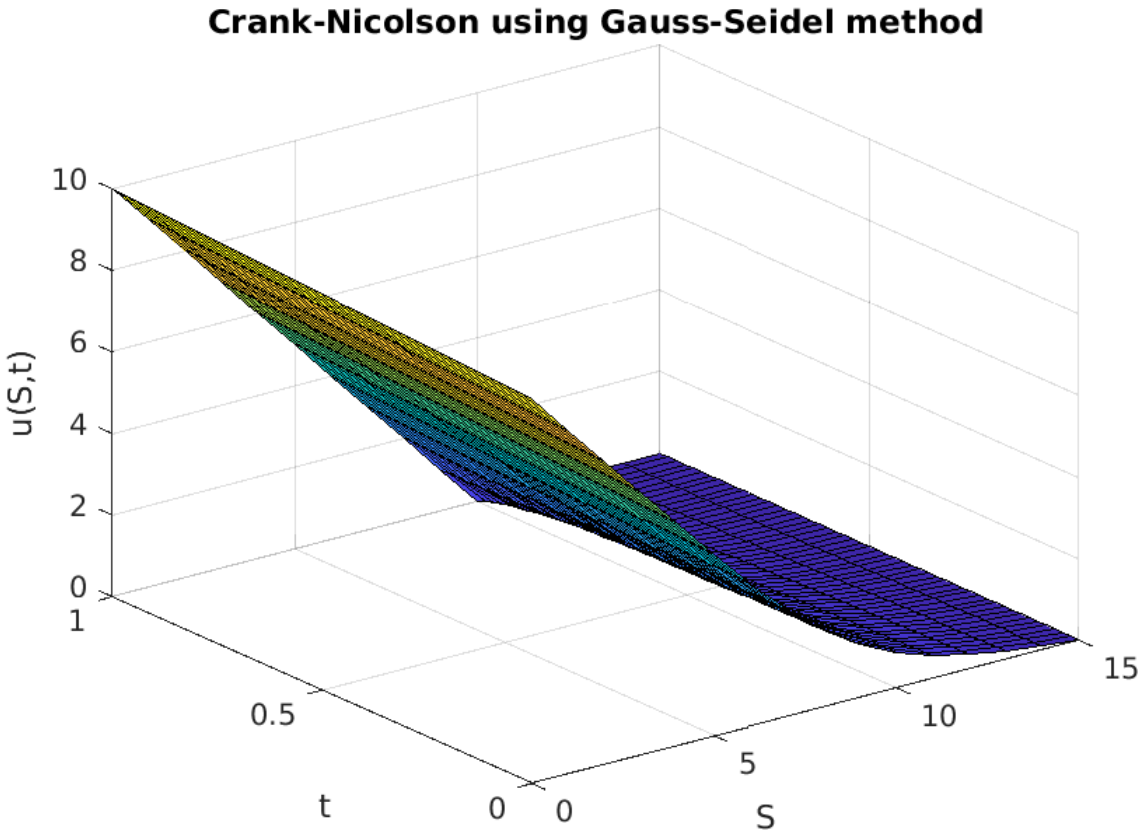

BTCS using SOR method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
10
8
6
4
2
0
-2
0
5
10
15

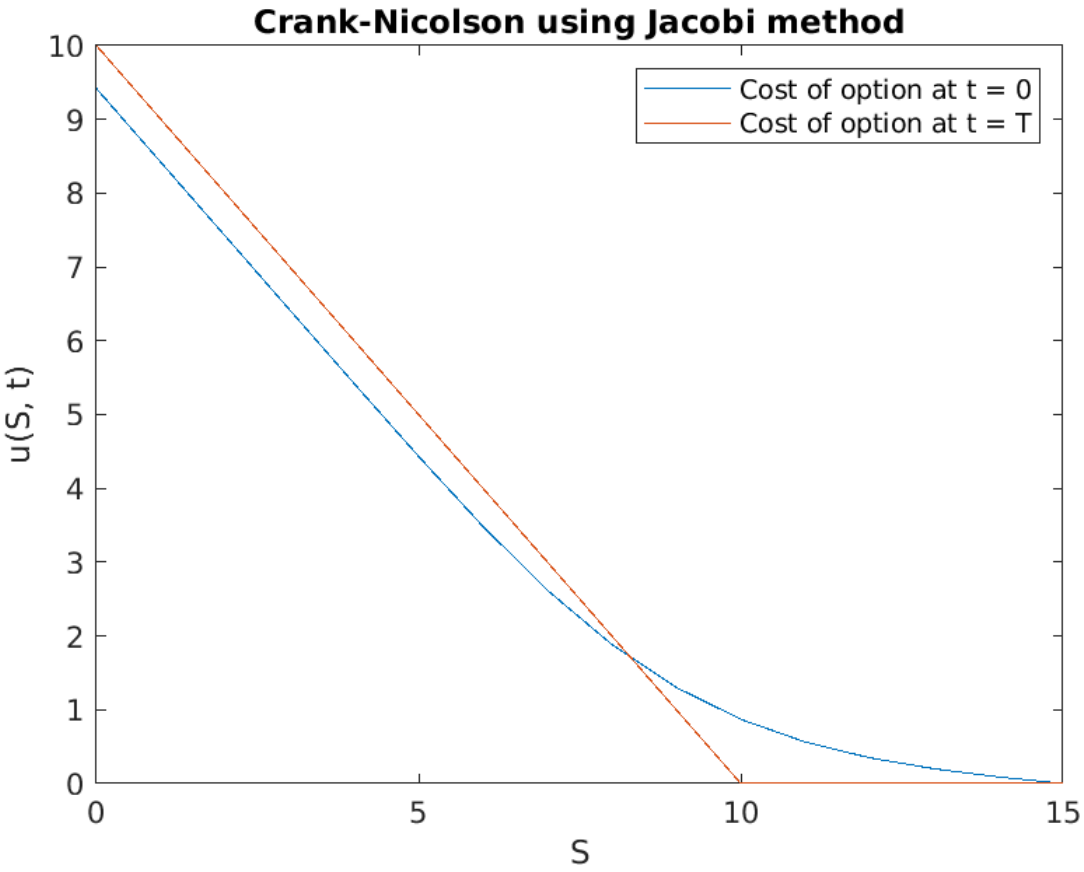

BTCS using SOR method
u(S,t)
10
8
6
4
2
0
-2
1
0.5
t
0
0
5
10
15
S

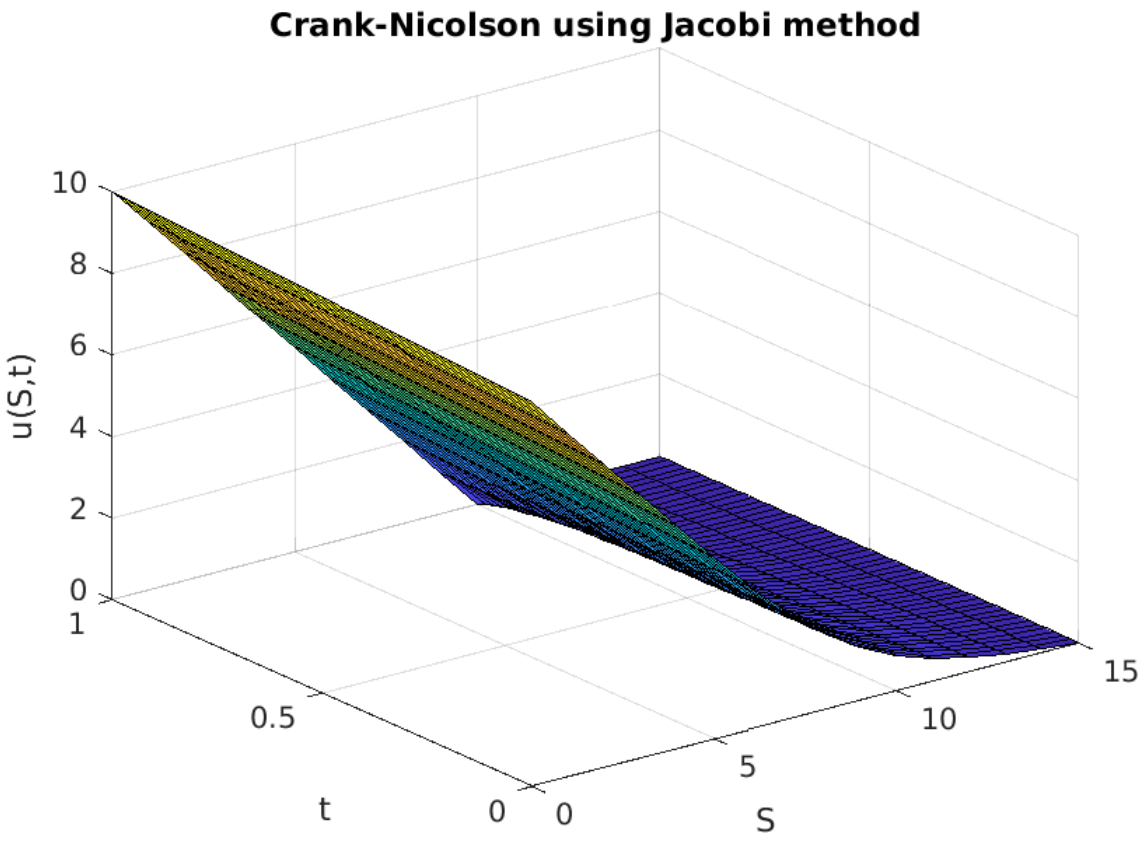

Crank-Nicolson using Matlab Back-Slash method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15

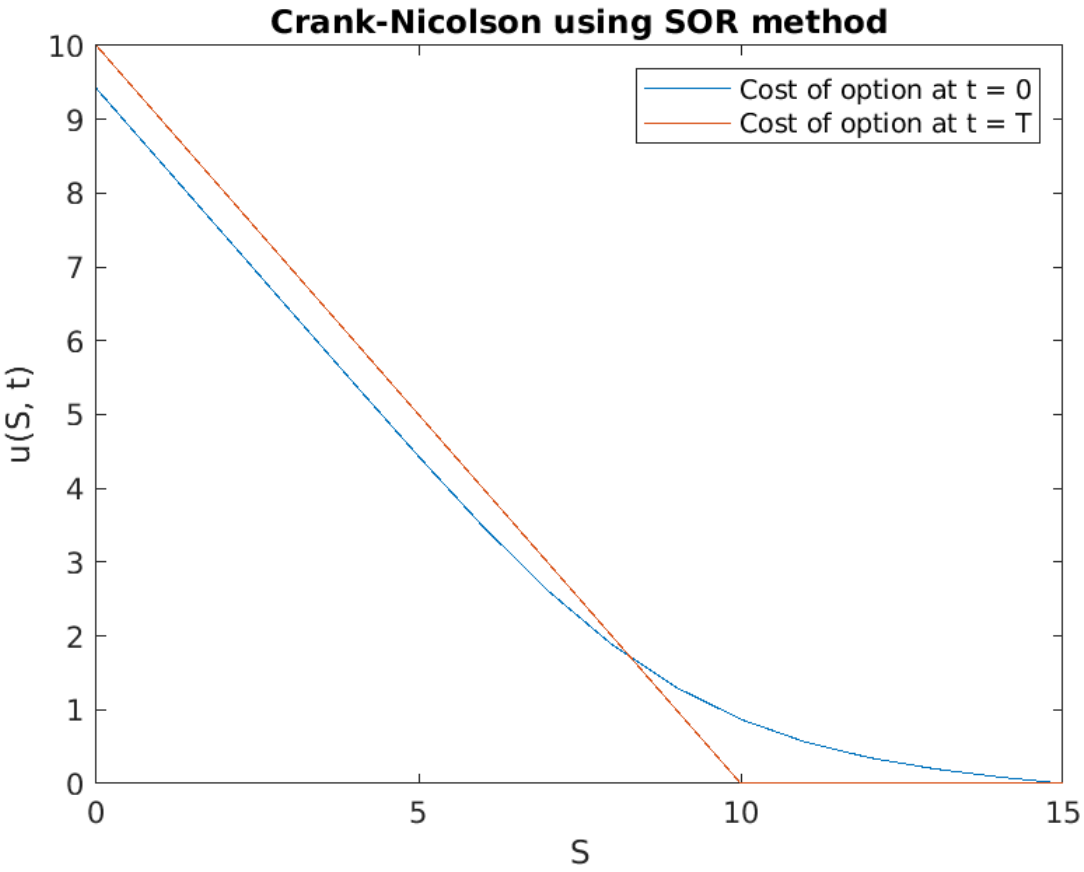

Crank-Nicolson using Matlab Back-Slash method
u(S,t)
10
8
6
4
2
0
1
0.5
t
0
0
5
10
15
S

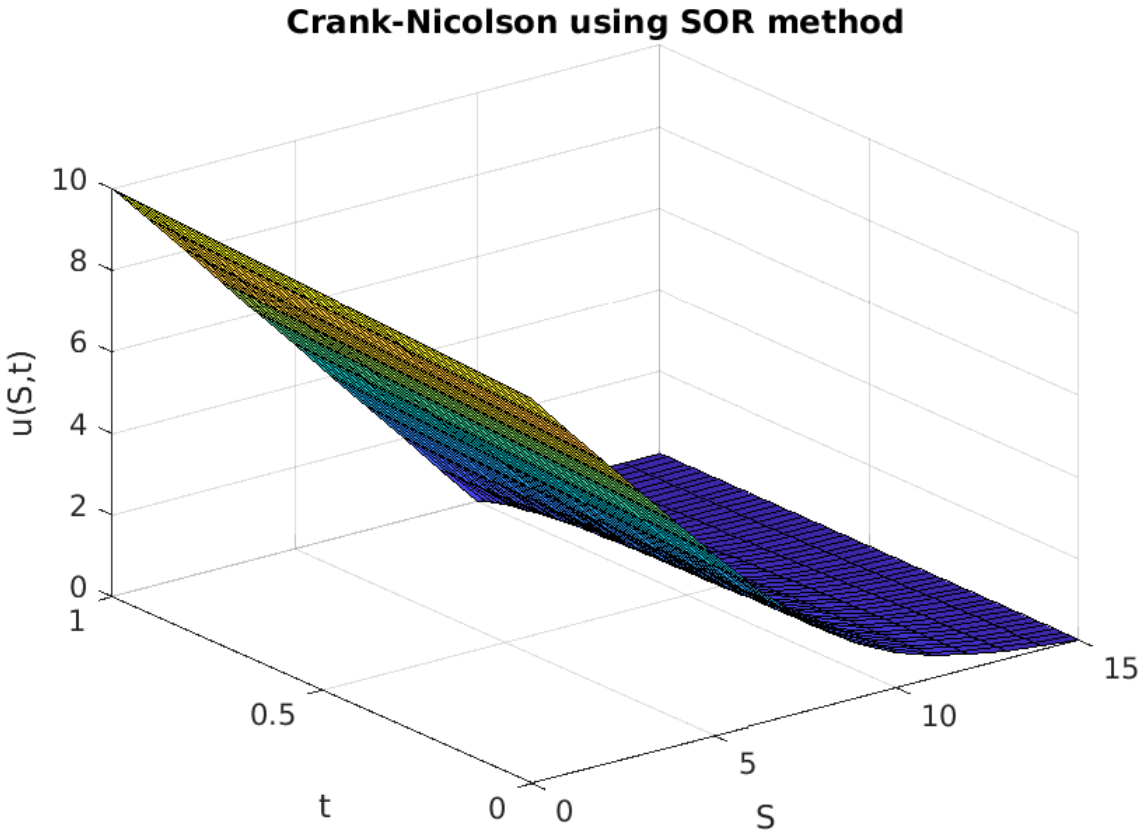

Crank-Nicolson using Gauss-Seidel method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15


Crank-Nicolson using Gauss-Seidel method
u(S,t)
10
8
6
4
2
0
1
0.5
t
0
0
5
10
15
S


Crank-Nicolson using Jacobi method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15


Crank-Nicolson using Jacobi method
u(S,t)
10
8
6
4
2
0
1
0.5
t
0
0
5
10
15
S


Crank-Nicolson using SOR method
Cost of option at t = 0
Cost of option at t = T
u(S, t)
S
0
1
2
3
4
5
6
7
8
9
10
0
5
10
15


Crank-Nicolson using SOR method
u(S,t)
10
8
6
4
2
0
1
0.5
t
0
0
5
10
15
S