MA374 – Financial Engineering II

LAB 02 Report

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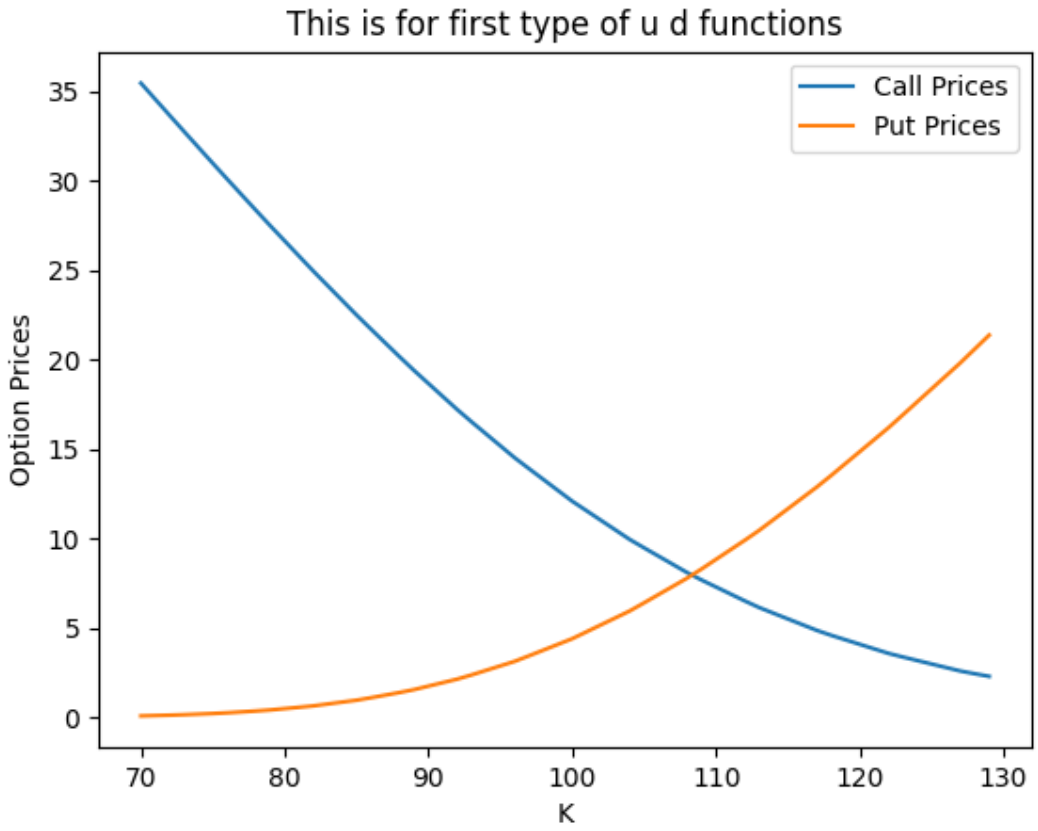
Question 1

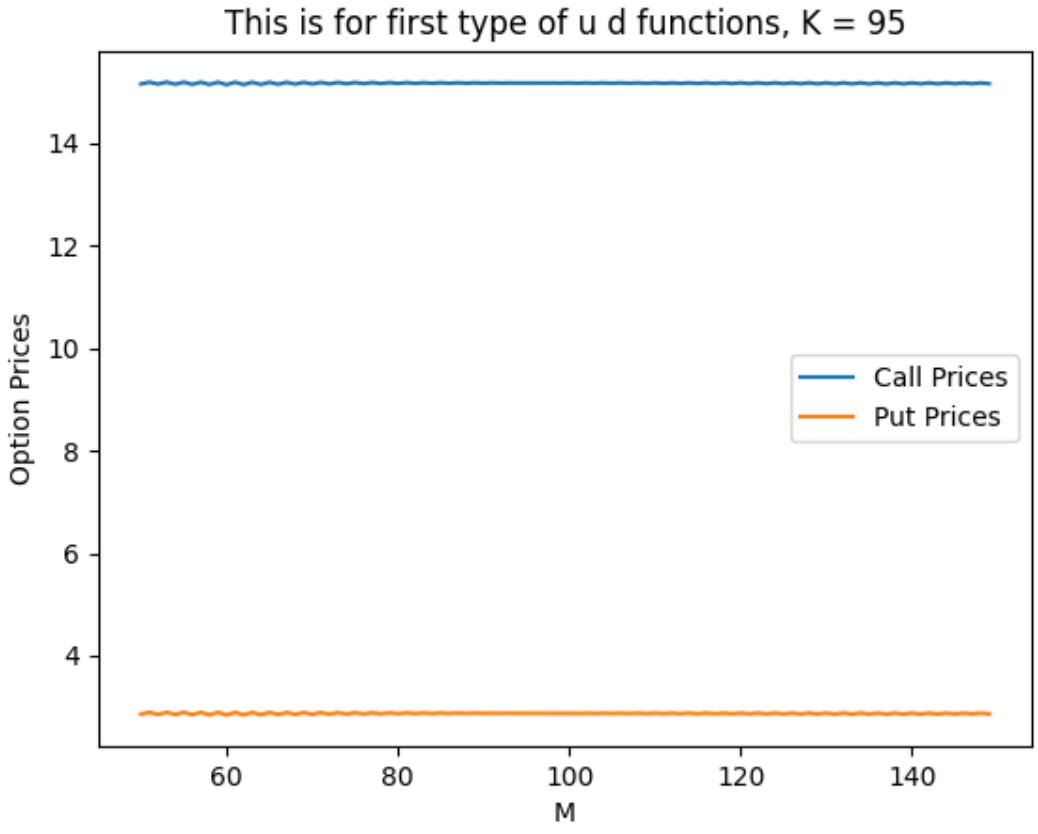
Observations –

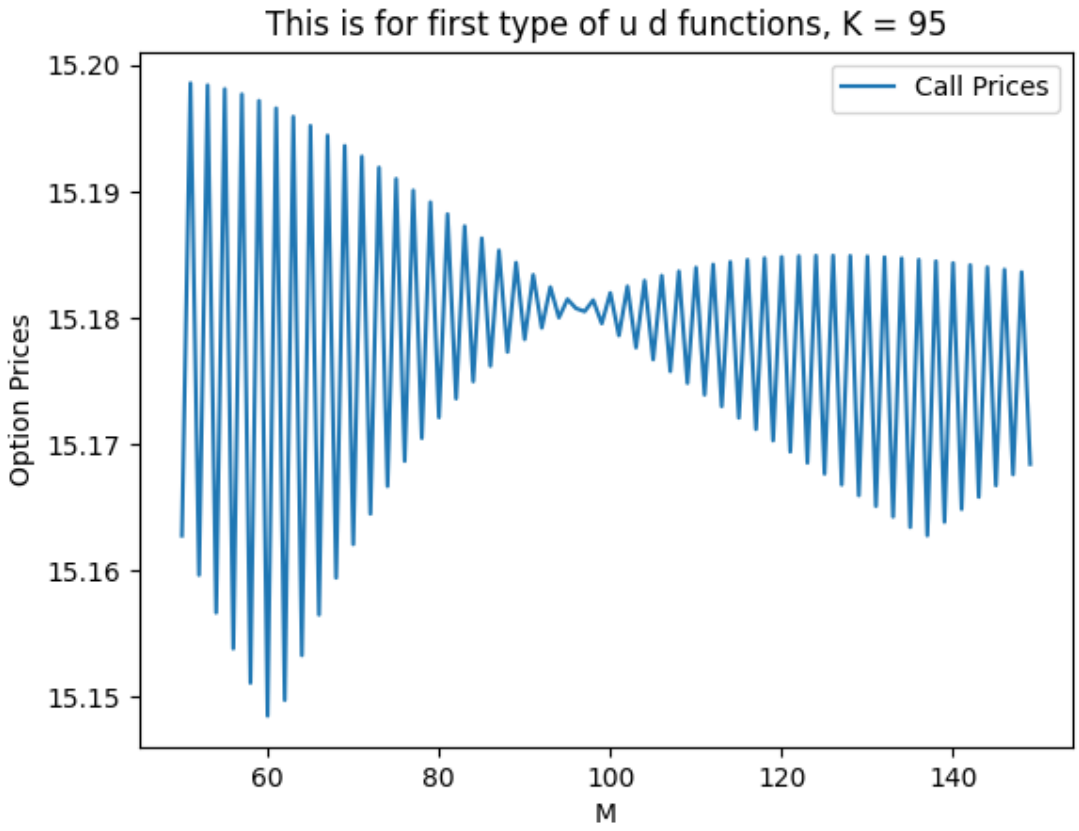
1. The call option becomes cheaper than the put after a certain value of K (approximately 108).
2. Call Prices is directly proportional to r and put is inversely proportional.
3. A linear relation can be seen with sigma and option prices.
4. Option Price vs S0 and Option Price vs K graphs look mirror image about 100 (the constant value of K in graph of S0 and the constant value of S0 in graph of K).
5. The graphs of M show oscillating pattern about some specific price.
6. The graph for both the sets is more or less similar expect the oscillating pattern seen in graphs of M.

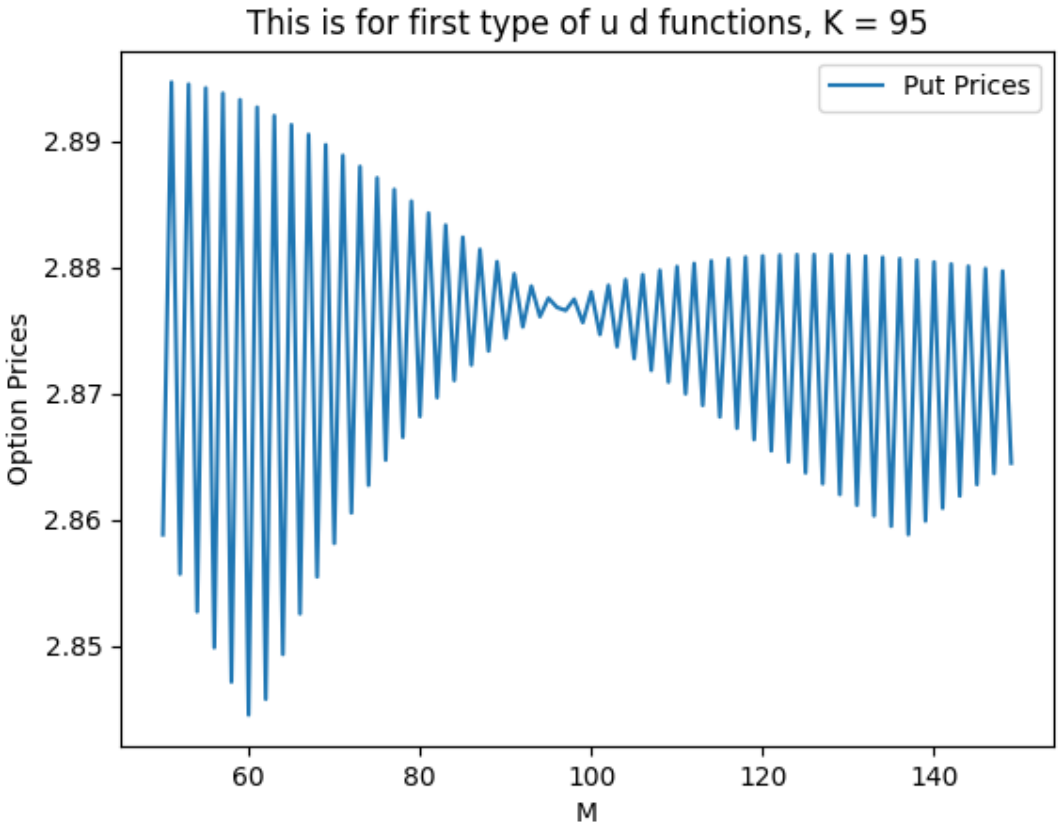
Graphs –

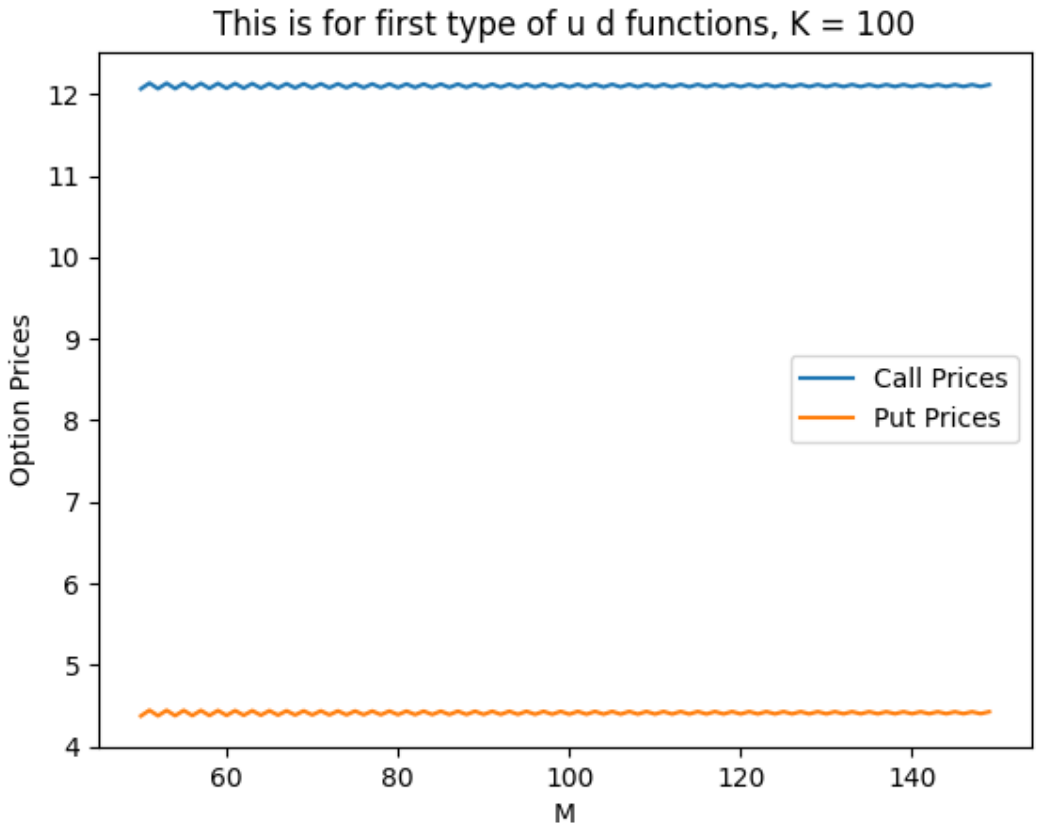
For the first set of U and D –

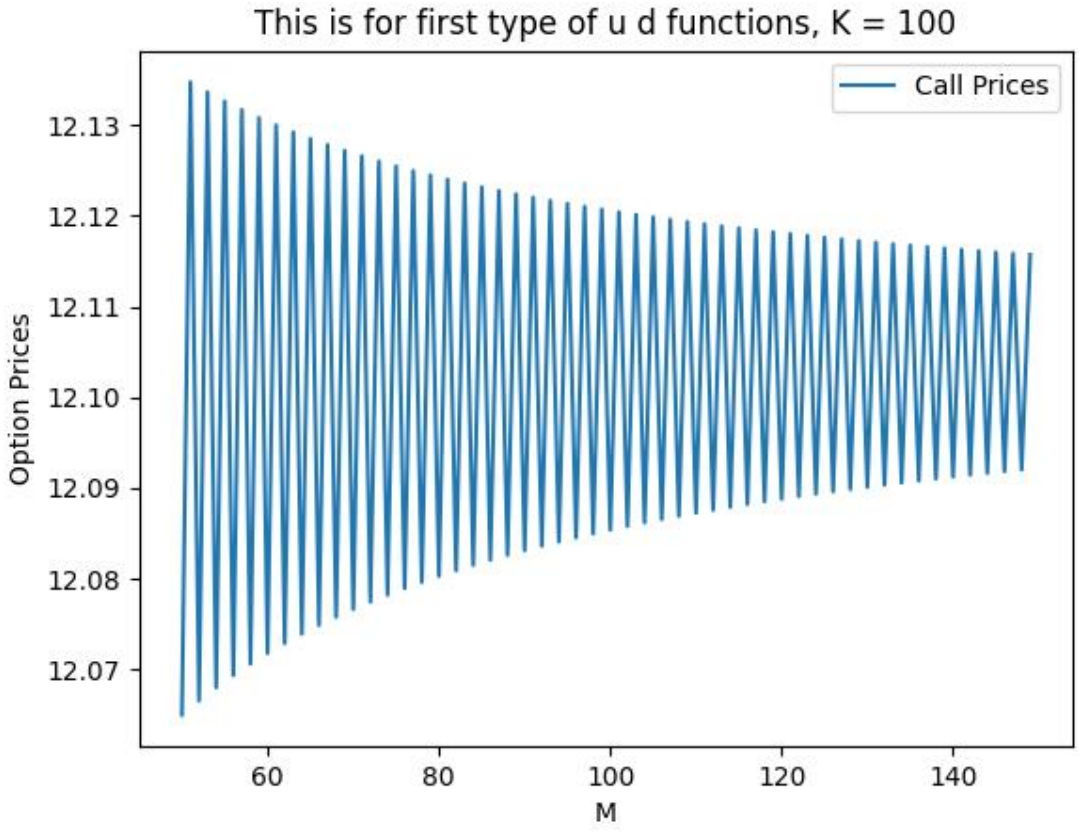

This is for first type of u d functions
Call Prices
Put Prices
Option Prices
35
30
25
20
15
10
5
0
70
80
90
100
110
120
130
K

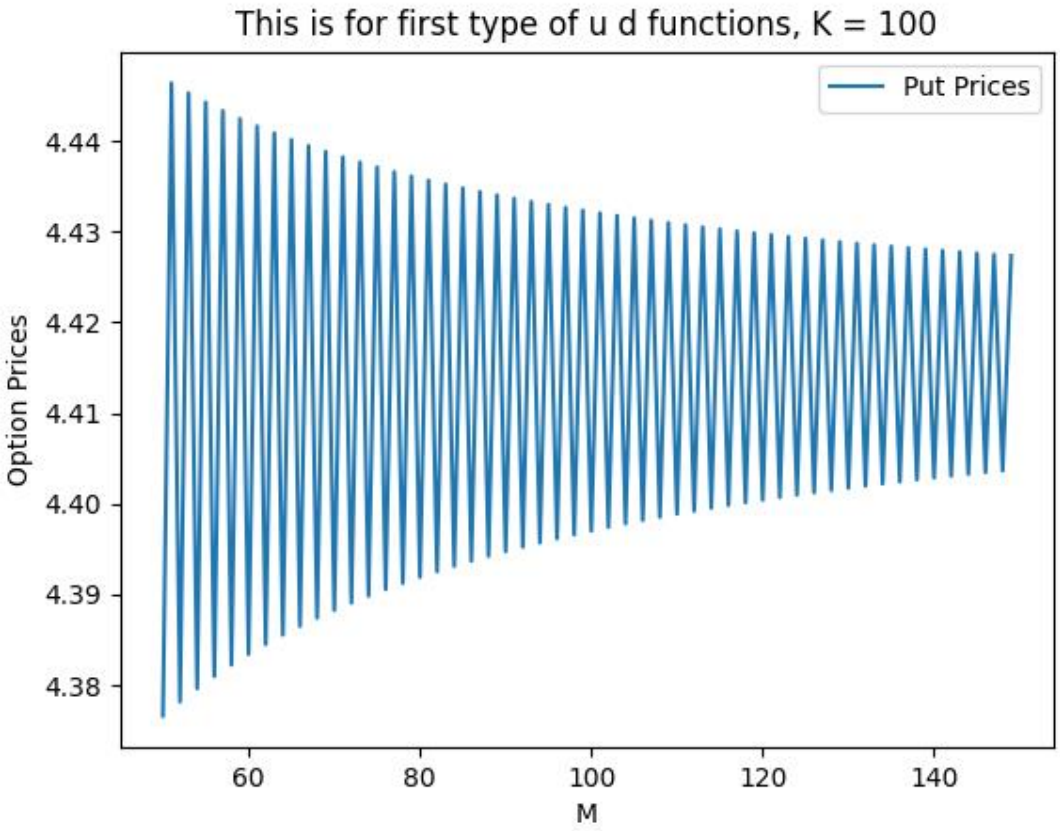

This is for first type of u d functions, K = 95
Call Prices
Put Prices
Option Prices
14
12
10
8
6
4
60
80
100
120
140
M

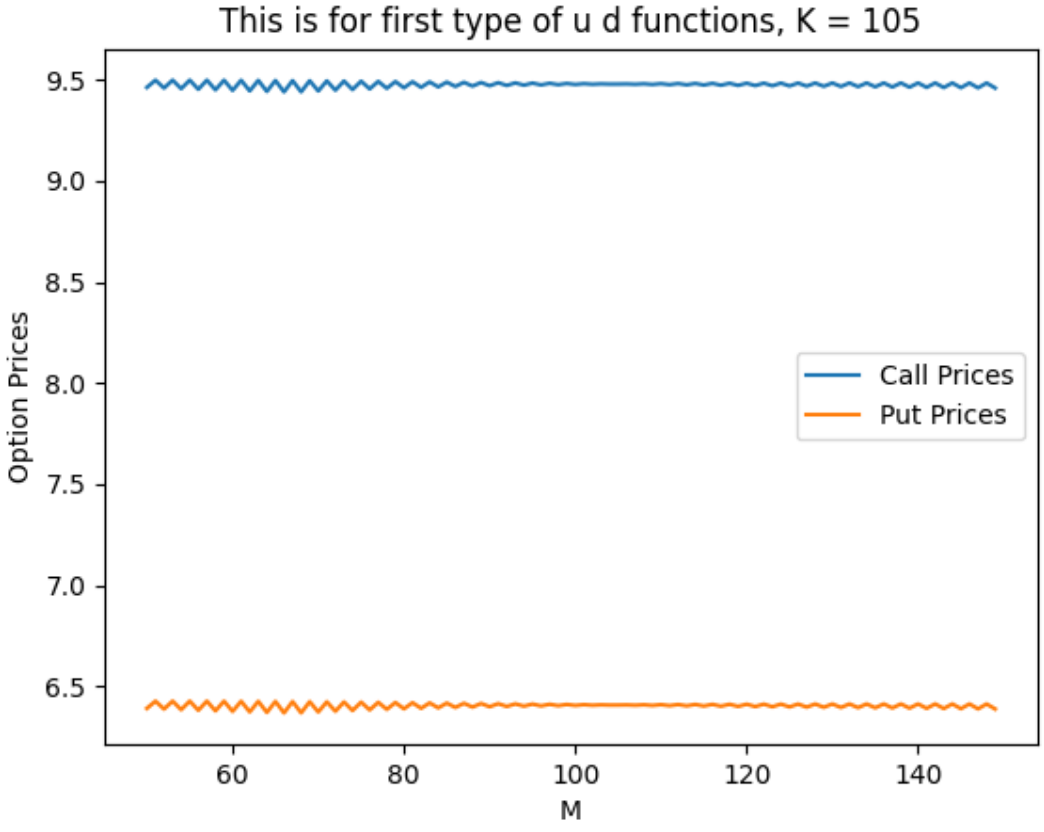

This is for first type of u d functions, K = 95
Call Prices
Option Prices
15.20
15.19
15.18
15.17
15.16
15.15
60
80
100
120
140
M

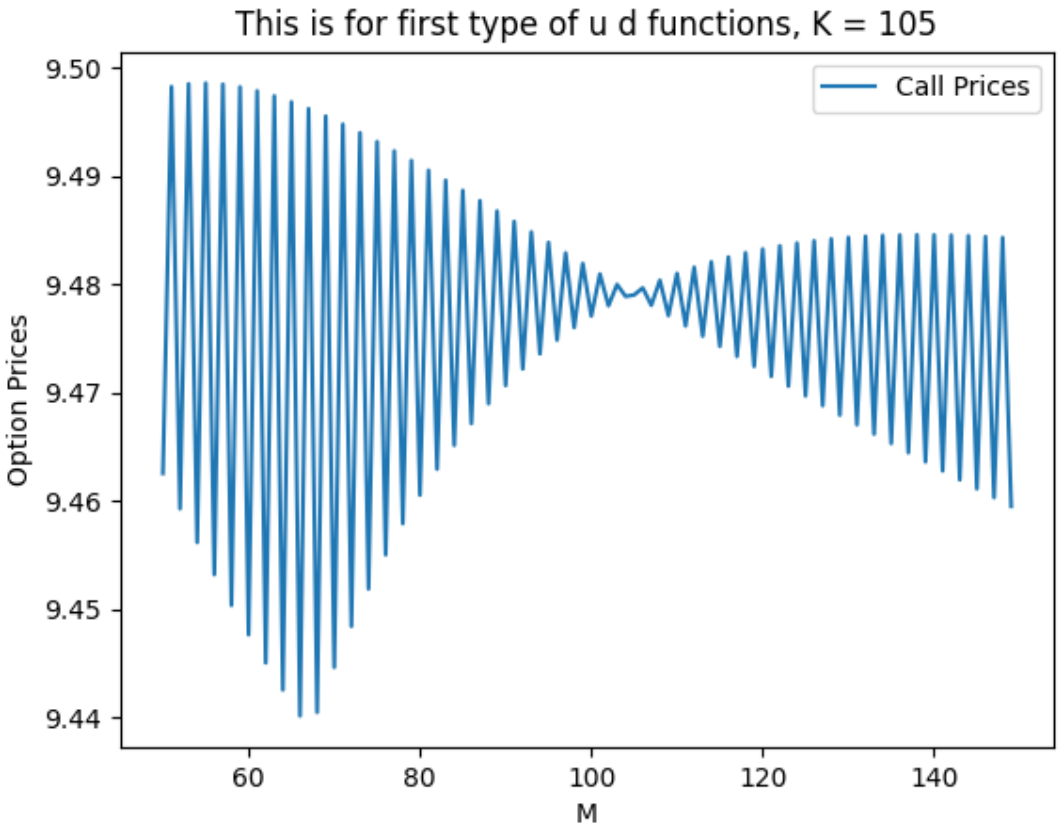

This is for first type of u d functions, K = 95
Put Prices
Option Prices
2.89
2.88
2.87
2.86
2.85
60
80
100
120
140
M


This is for first type of u d functions, K = 100
Option Prices
M
Call Prices
Put Prices
12
11
10
9
8
7
6
5
4
60
80
100
120
140


This is for first type of u d functions, K = 100
Option Prices
M
Call Prices
12.13
12.12
12.11
12.10
12.09
12.08
12.07
60
80
100
120
140


This is for first type of u d functions, K = 100
Put Prices
Option Prices
4.44
4.43
4.42
4.41
4.40
4.39
4.38
60
80
100
120
140
M


This is for first type of u d functions, K = 105
Call Prices
Put Prices
Option Prices
9.5
9.0
8.5
8.0
7.5
7.0
6.5
60
80
100
120
140
M


This is for first type of u d functions, K = 105
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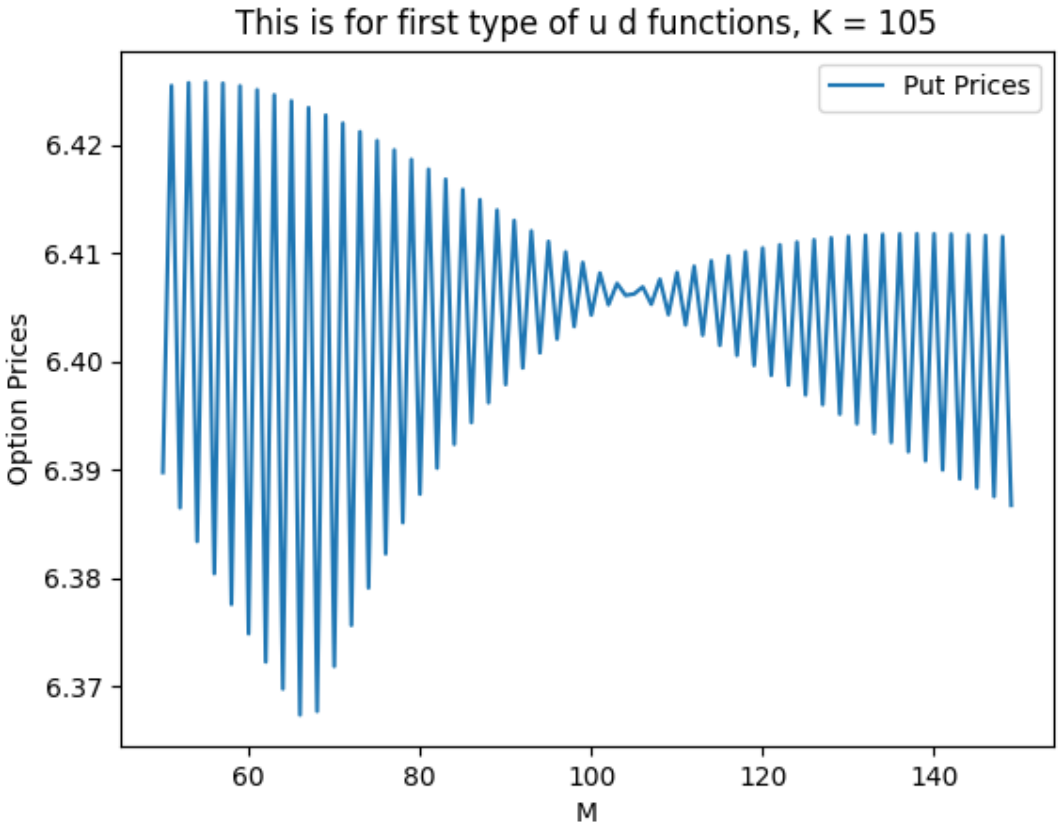
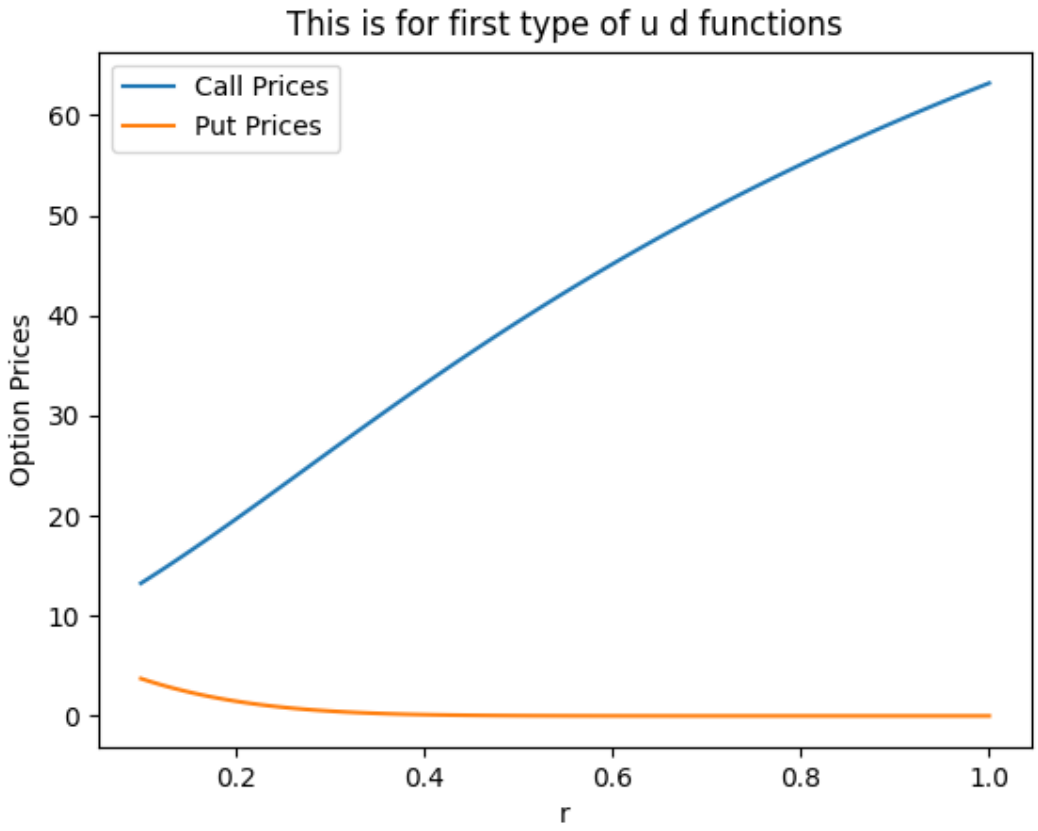
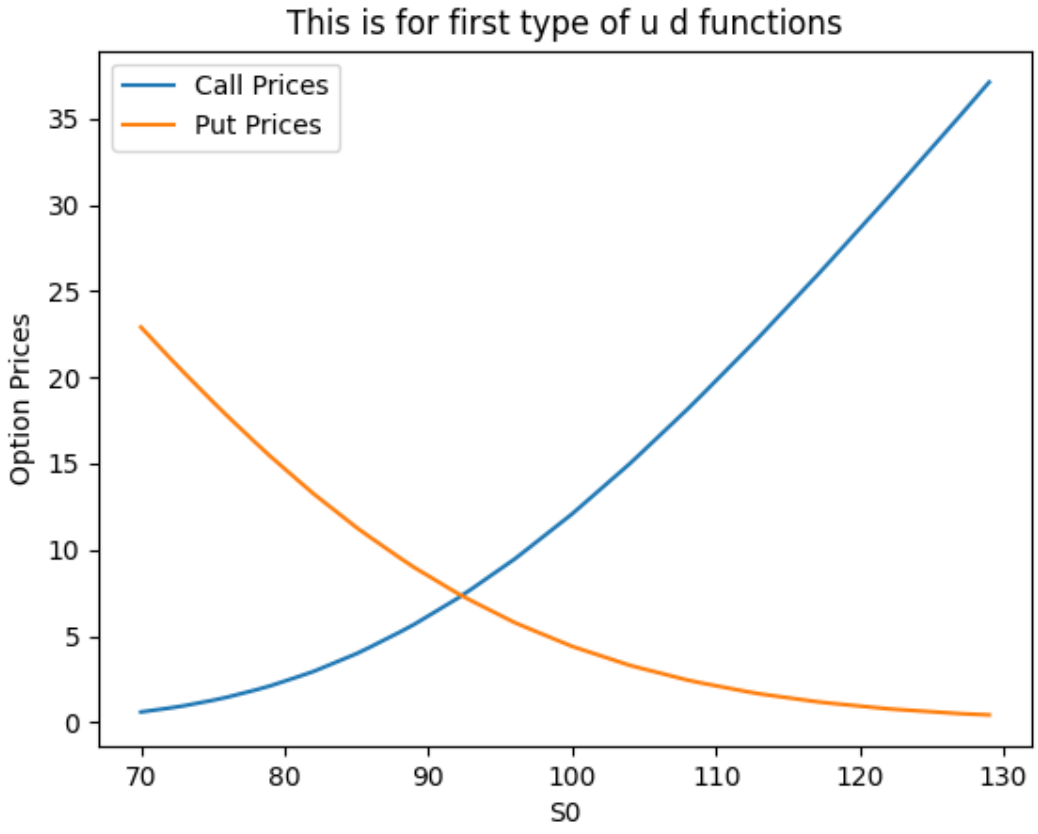
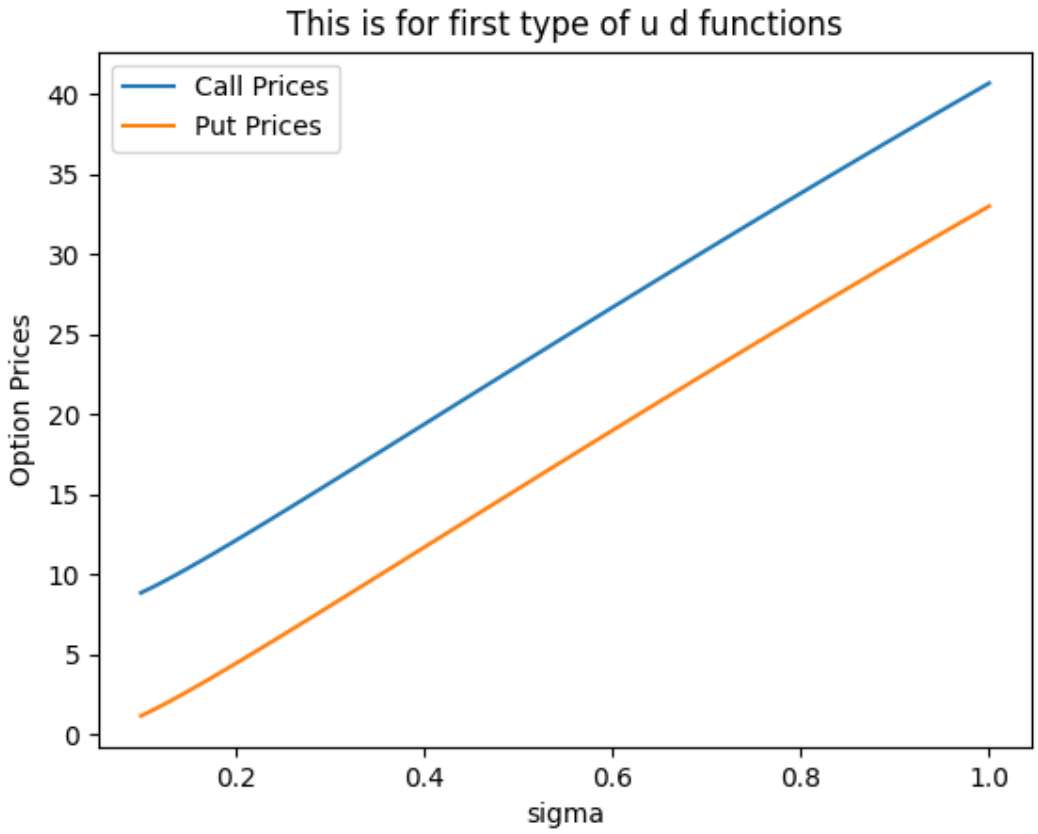
Option Prices
9.50
9.49
9.48
9.47
9.46
9.45
9.44
60
80
100
120
140
M

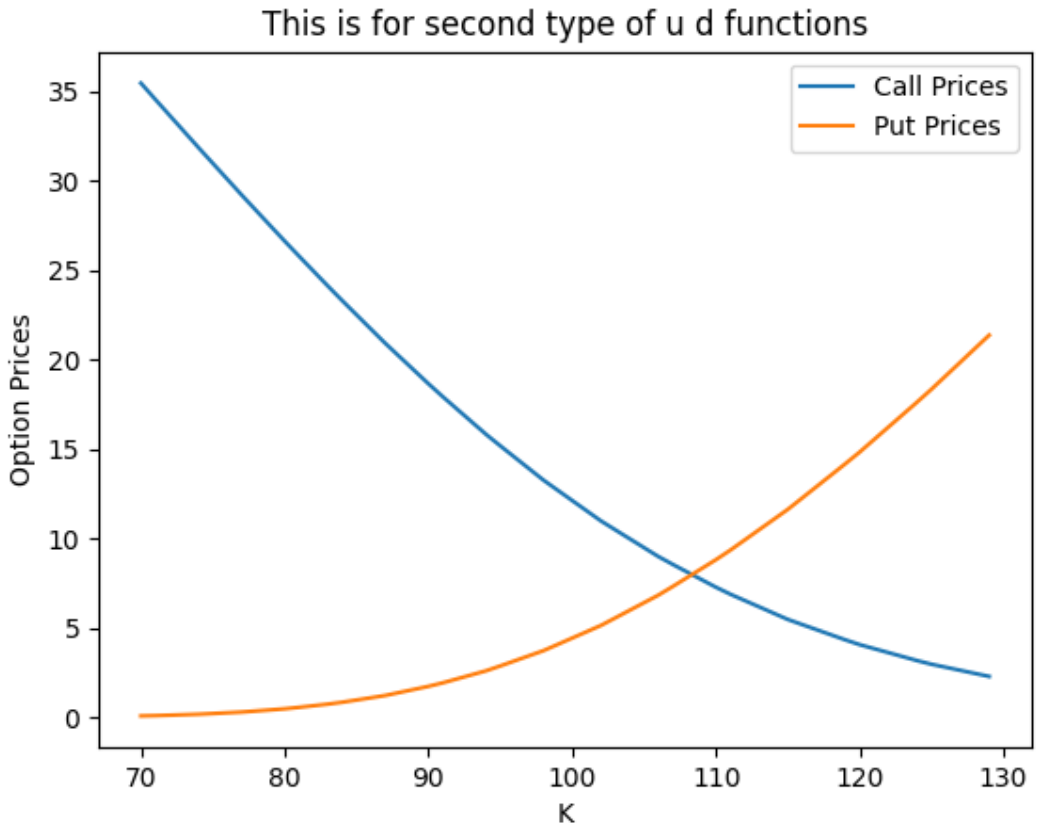

This is for first type of u d functions, K = 105
Put Prices
Option Prices
6.42
6.41
6.40
6.39
6.38
6.37
60
80
100
120
140
M

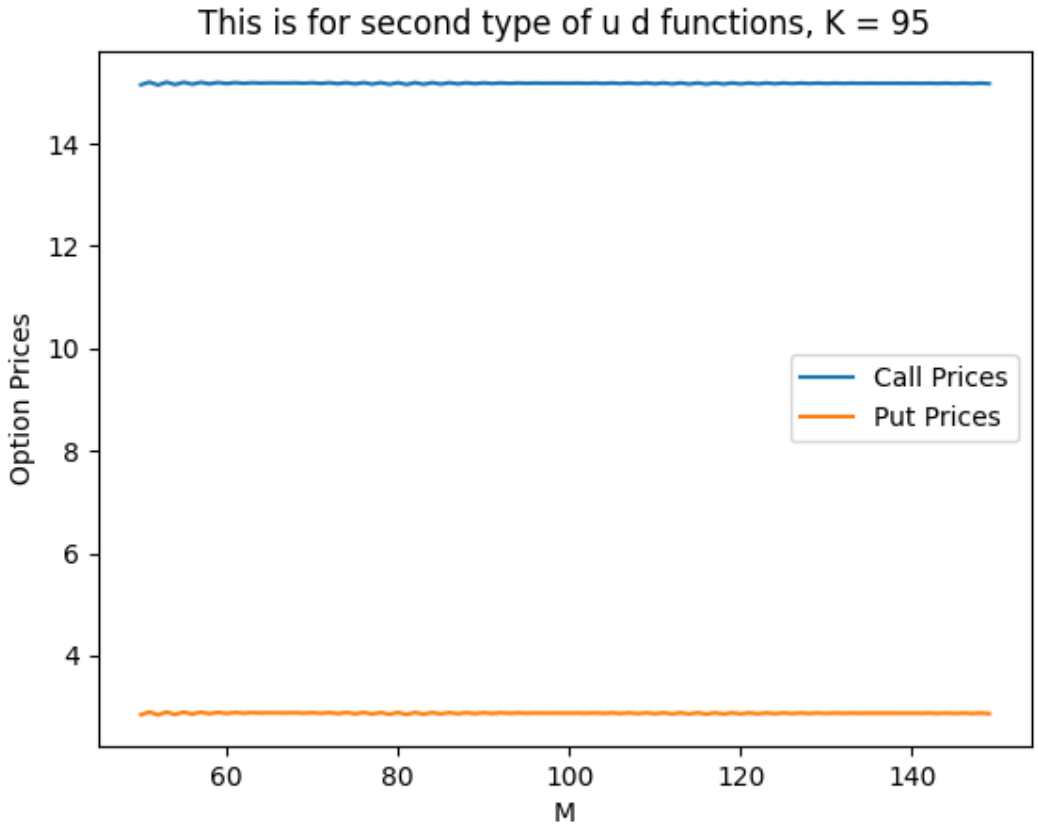

This is for first type of u d functions
Call Prices
Put Prices
Option Prices
60
50
40
30
20
10
0
0.2
0.4
0.6
0.8
1.0
r

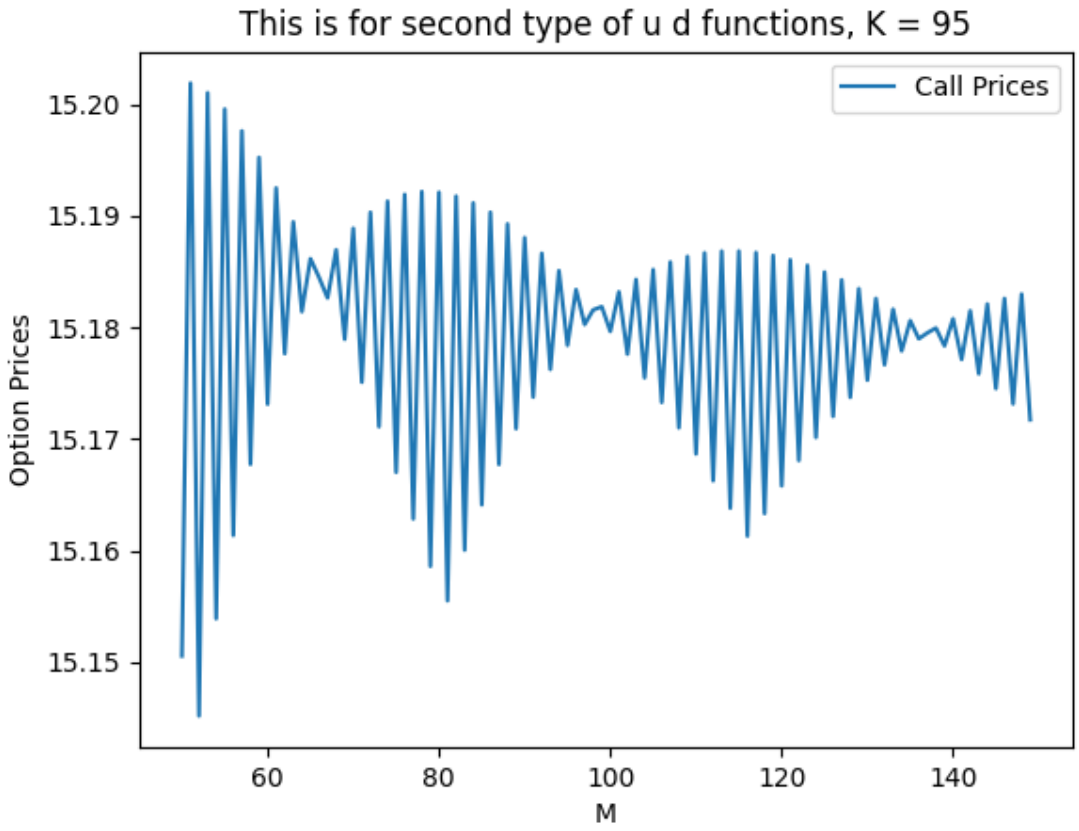

This is for first type of u d functions
Call Prices
Put Prices
Option Prices
35
30
25
20
15
10
5
0
70
80
90
100
110
120
130
S0

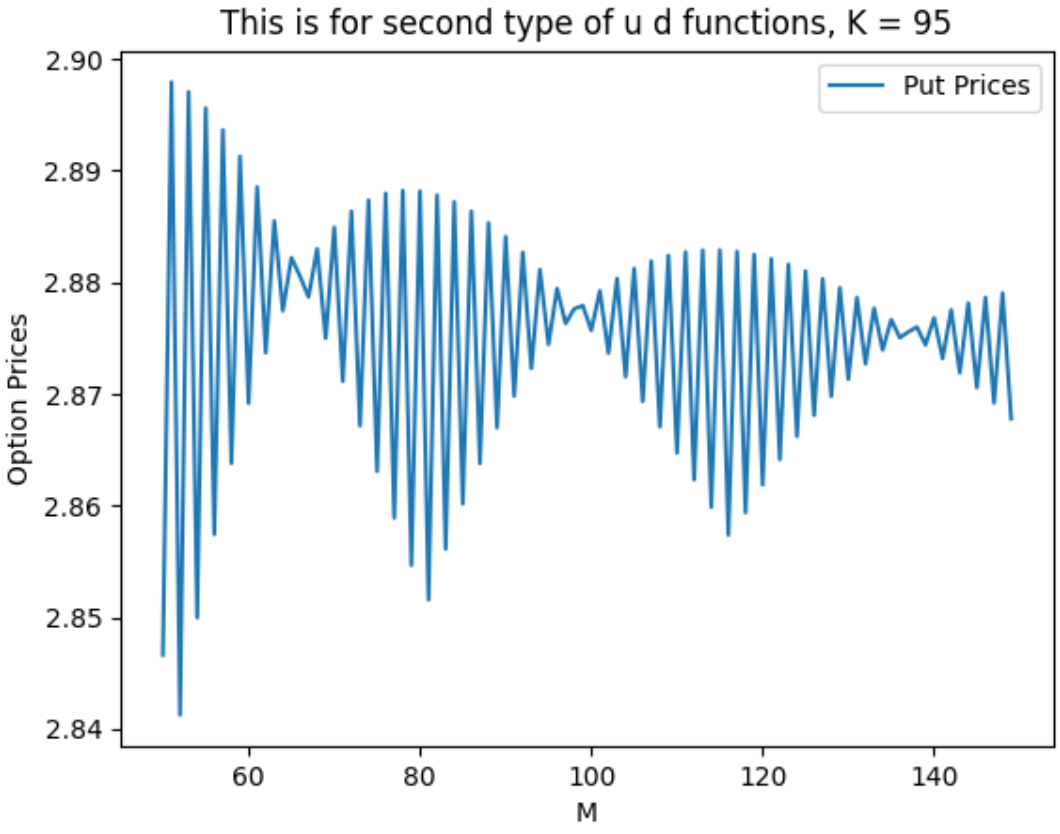


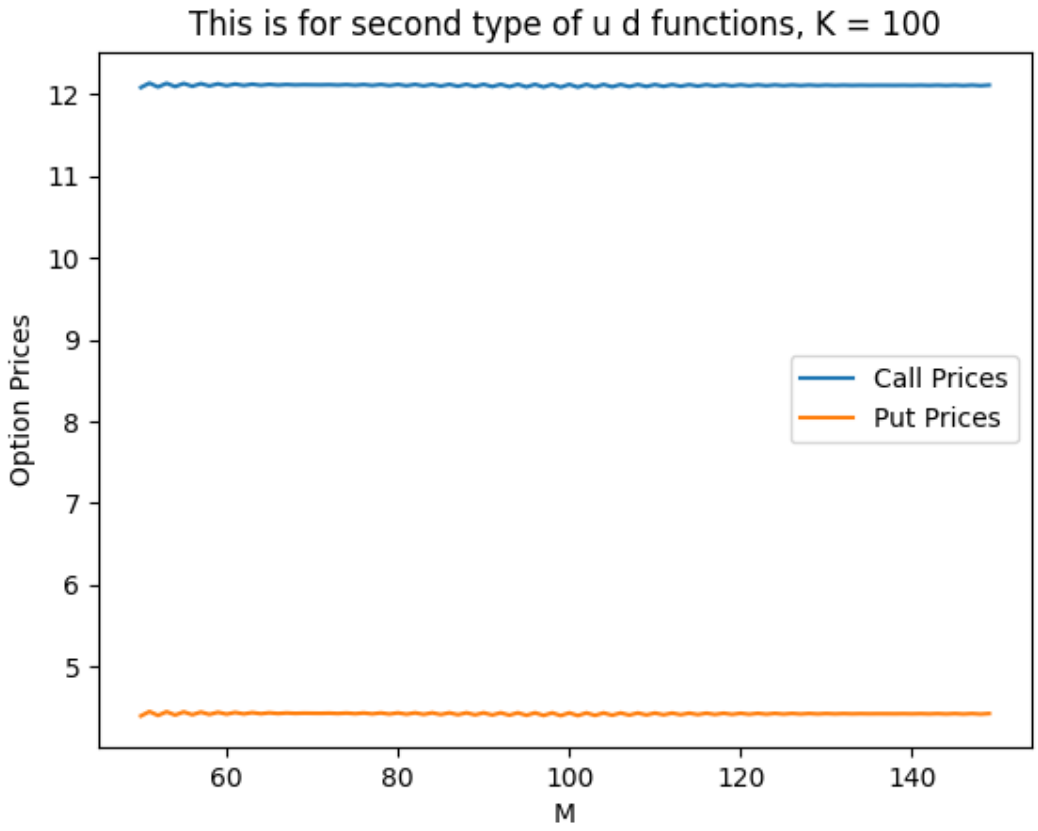
For the second set of U and D –

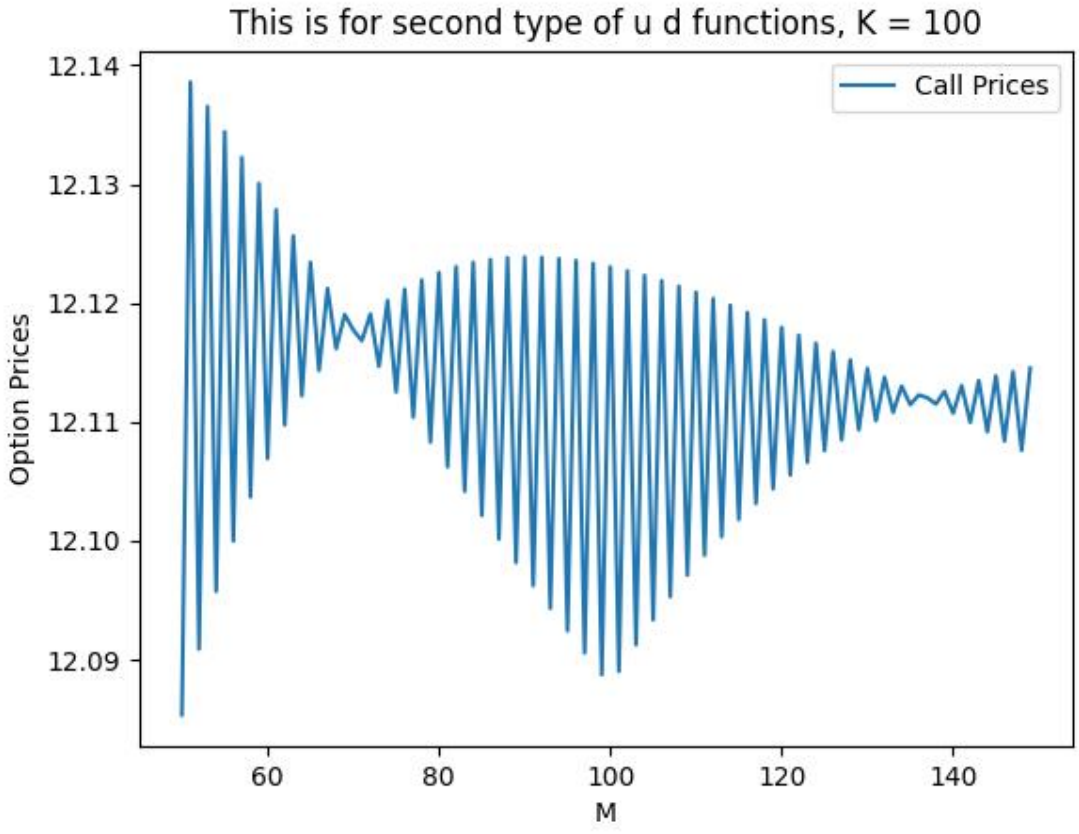

This is for second type of u d functions
Call Prices
Put Prices
Option Prices
35
30
25
20
15
10
5
0
70
80
90
100
110
120
130
K

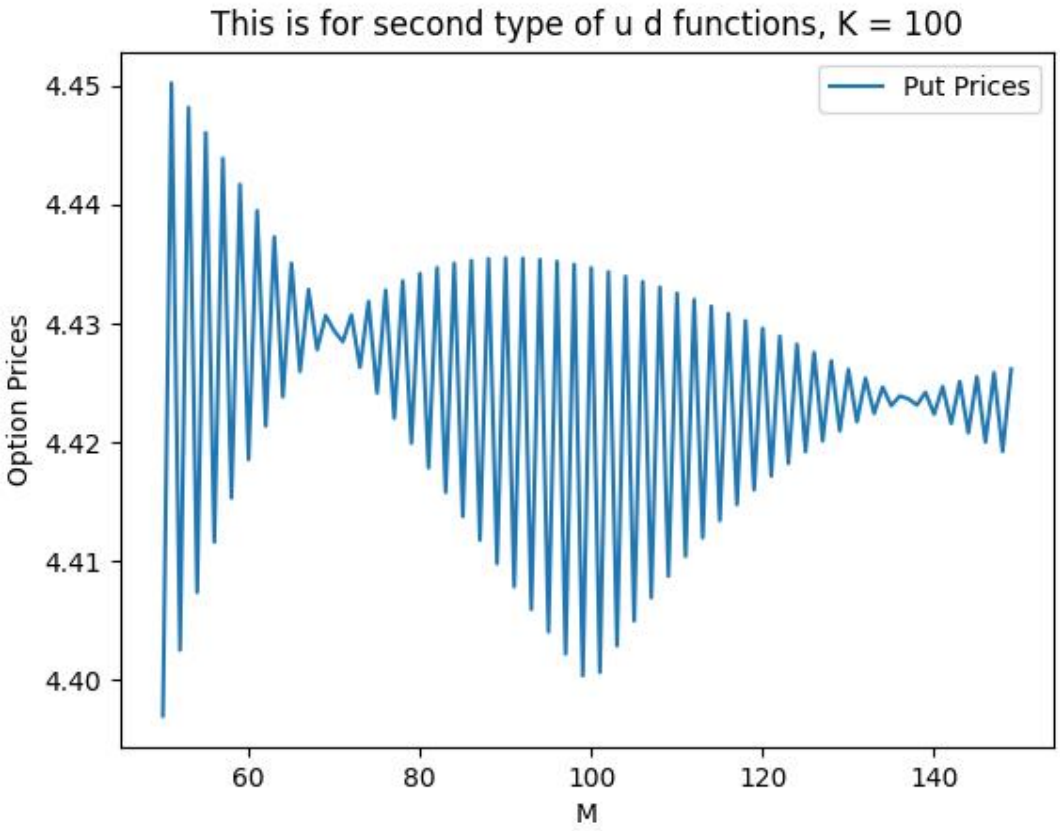

This is for second type of u d functions, K = 95
Call Prices
Put Prices
Option Prices
14
12
10
8
6
4
60
80
100
120
140
M

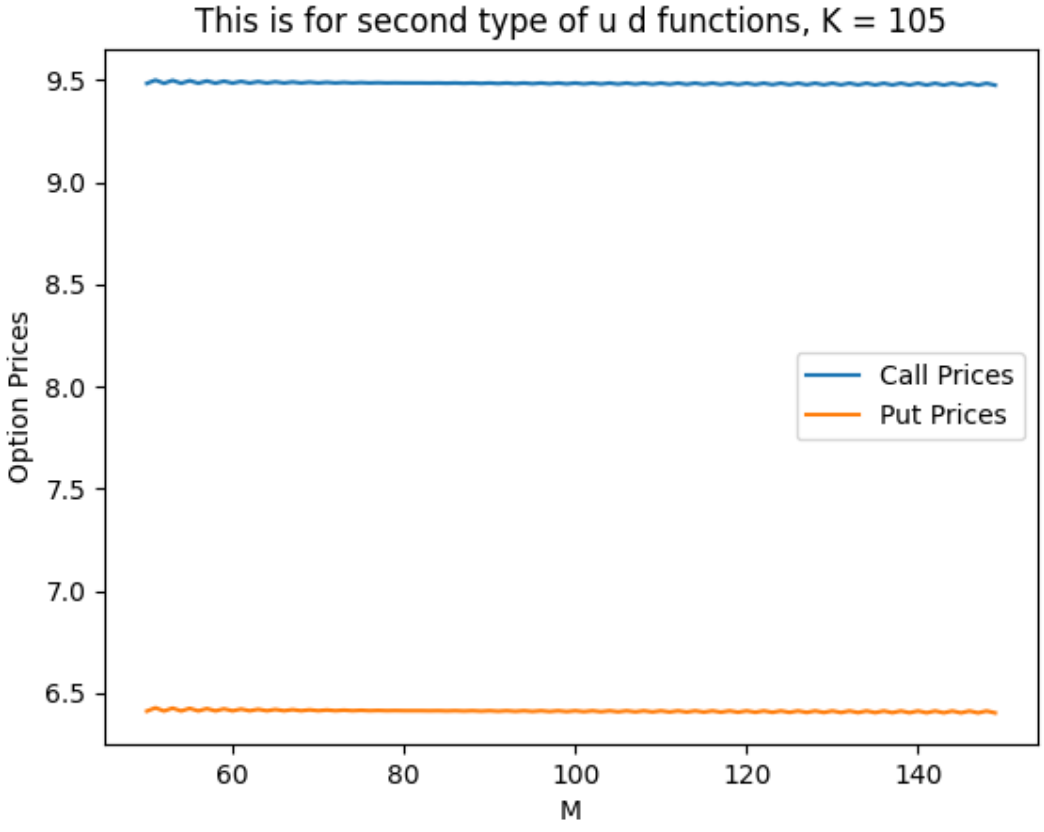

This is for second type of u d functions, K = 95
Call Prices
Option Prices
15.20
15.19
15.18
15.17
15.16
15.15
60
80
100
120
140
M

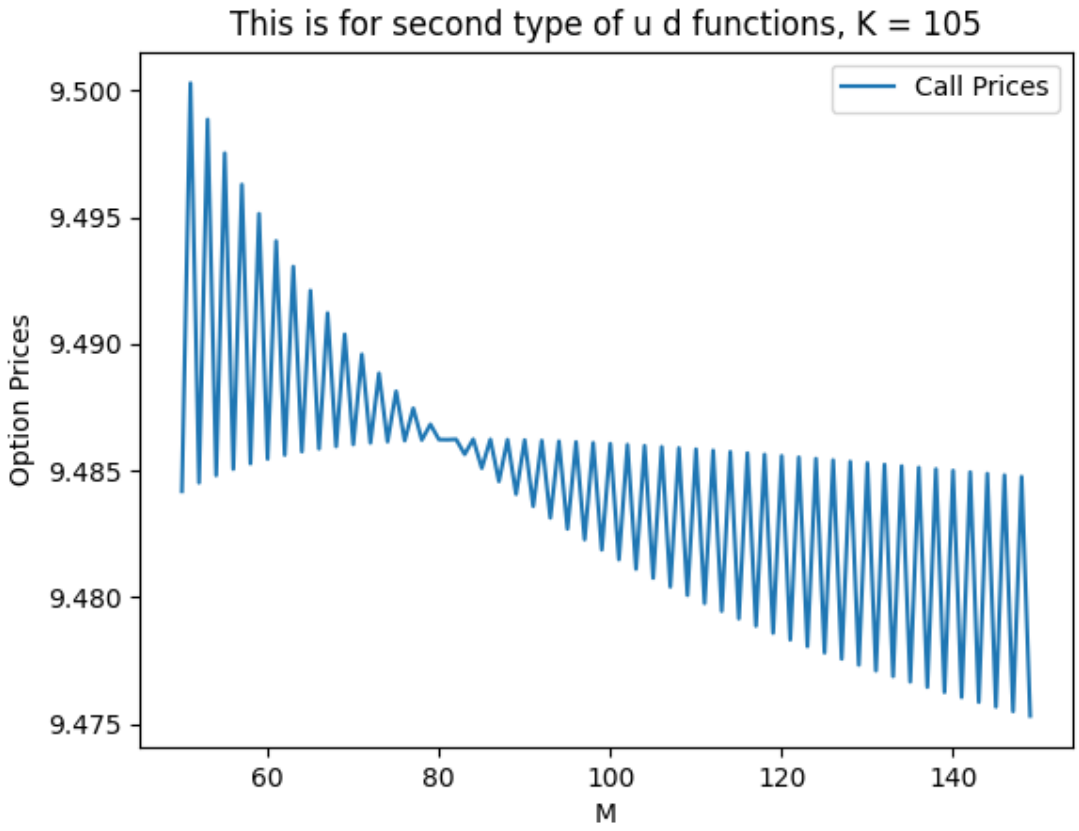

This is for second type of u d functions, K = 95
Put Prices
Option Prices
2.90
2.89
2.88
2.87
2.86
2.85
2.84
60
80
100
120
140
M


This is for second type of u d functions, K = 100
Option Prices
M
Call Prices
Put Prices
12
11
10
9
8
7
6
5
60
80
100
120
140


This is for second type of u d functions, K = 100
Option Prices
M
Call Prices
12.14
12.13
12.12
12.11
12.10
12.09
60
80
100
120
140


This is for second type of u d functions, K = 100
Put Prices
Option Prices
4.45
4.44
4.43
4.42
4.41
4.40
60
80
100
120
140
M


This is for second type of u d functions, K = 105
Call Prices
Put Prices
Option Prices
9.5
9.0
8.5
8.0
7.5
7.0
6.5
60
80
100
120
140
M


This is for second type of u d functions, K = 105
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Option Prices
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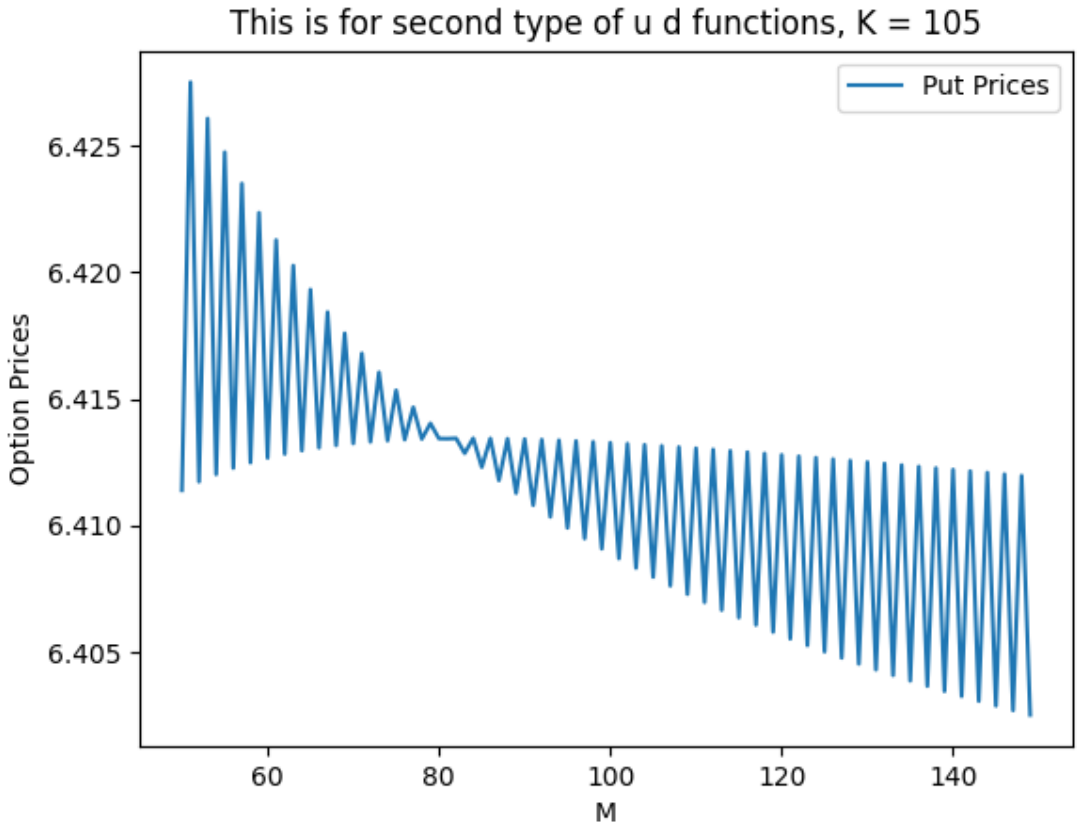
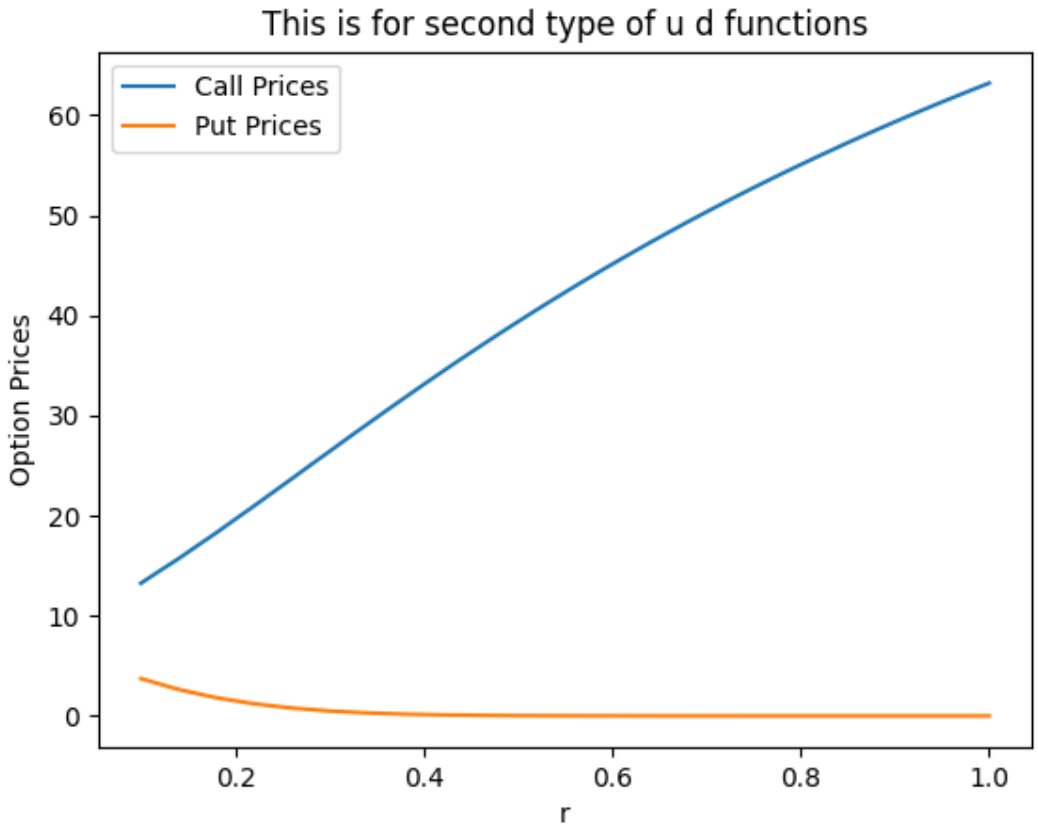
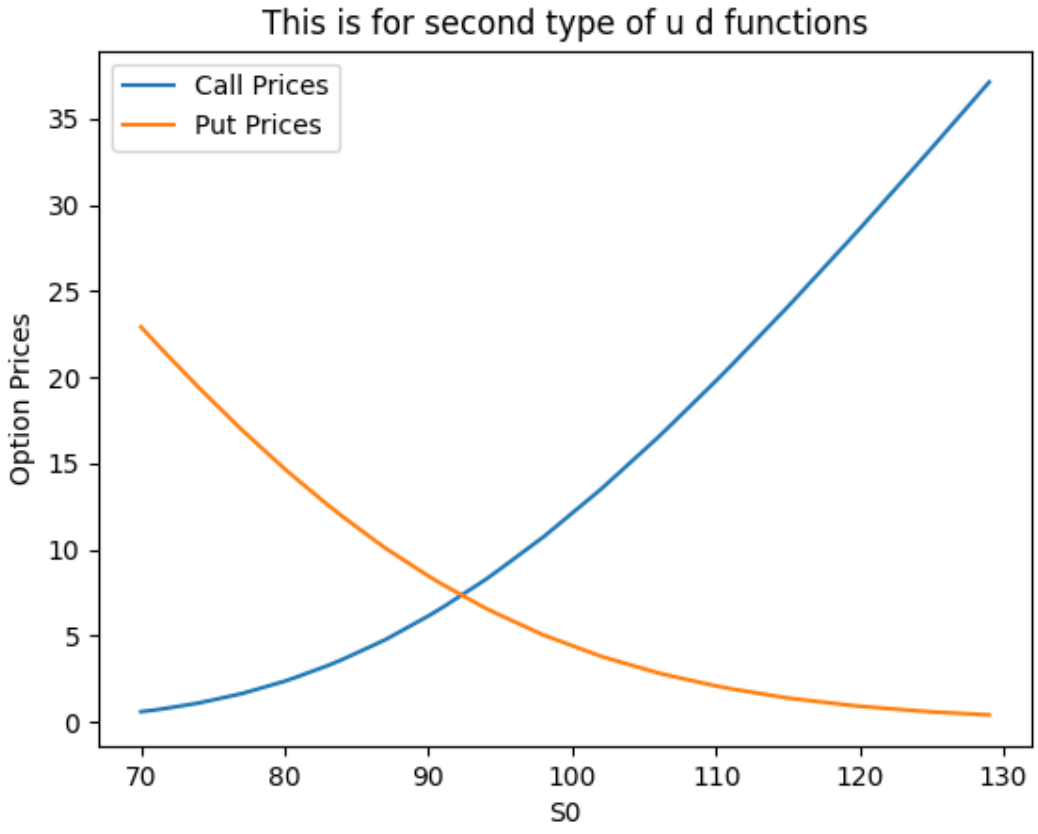
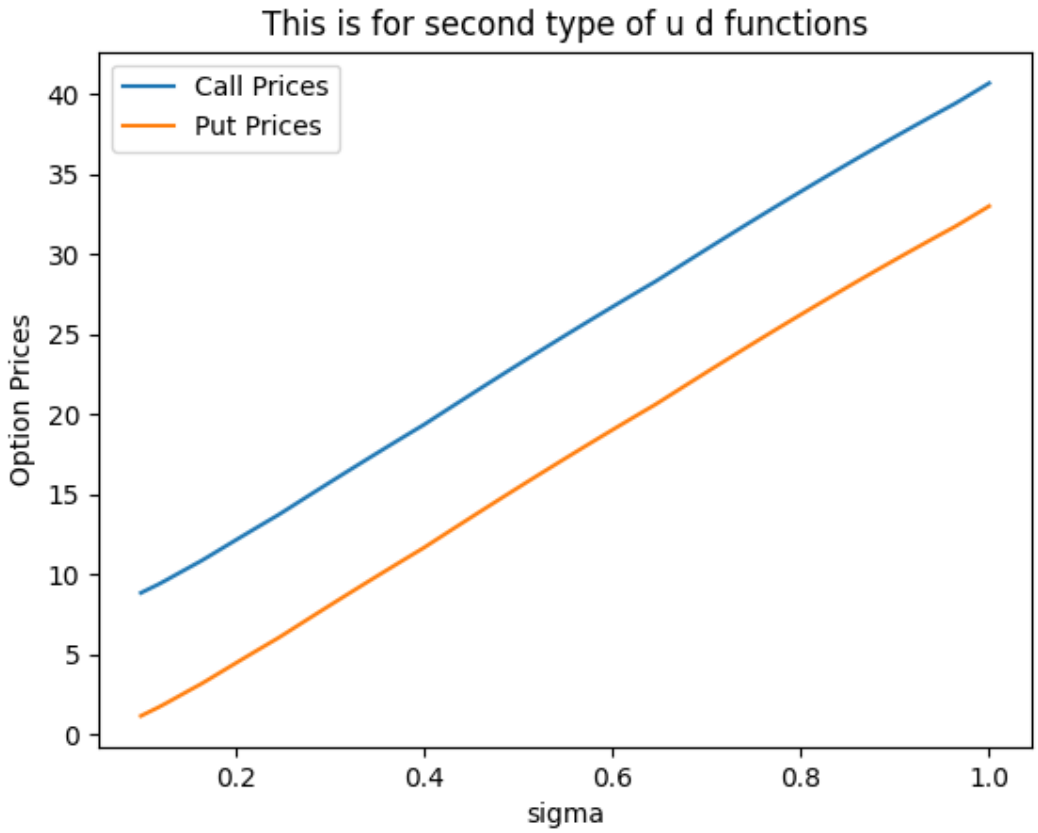
9.495
9.490
9.485
9.480
9.475
60
80
100
120
140
M


This is for second type of u d functions, K = 105
Put Prices
Option Prices
6.425
6.420
6.415
6.410
6.405
60
80
100
120
140
M


This is for second type of u d functions
Call Prices
Put Prices
Option Prices
60
50
40
30
20
10
0
0.2
0.4
0.6
0.8
1.0
r


This is for second type of u d functions
Call Prices
Put Prices
Option Prices
35
30
25
20
15
10
5
0
70
80
90
100
110
120
130
S0

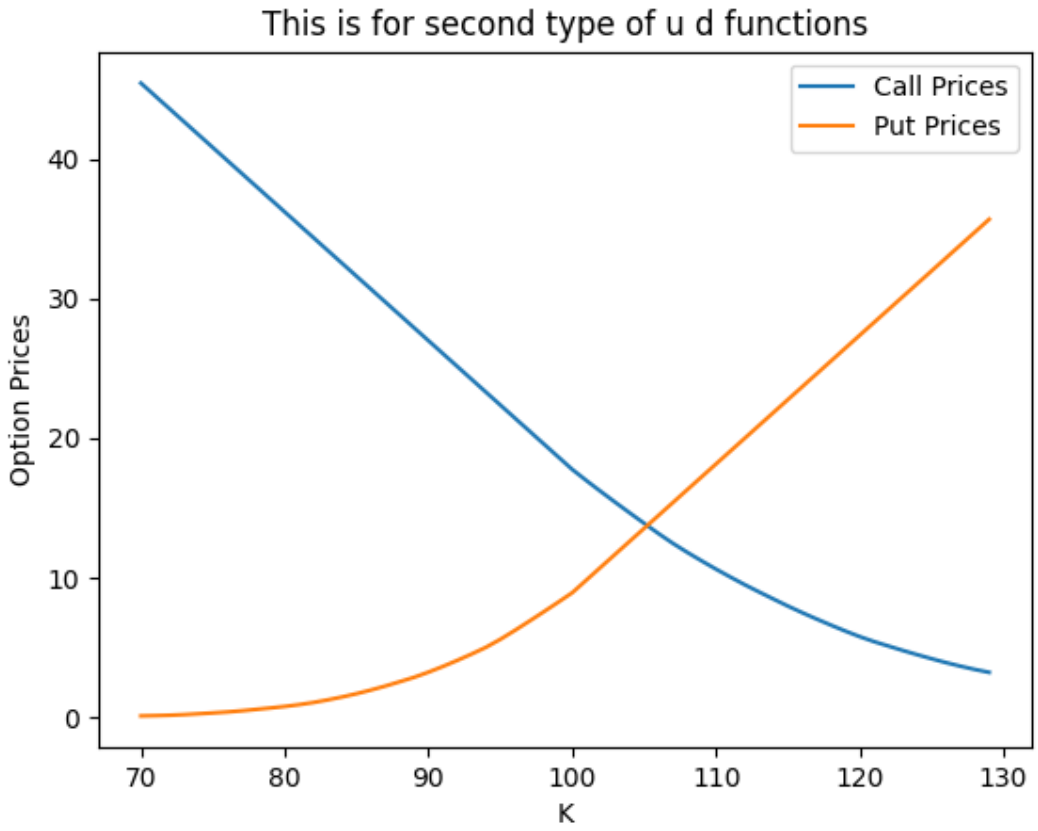


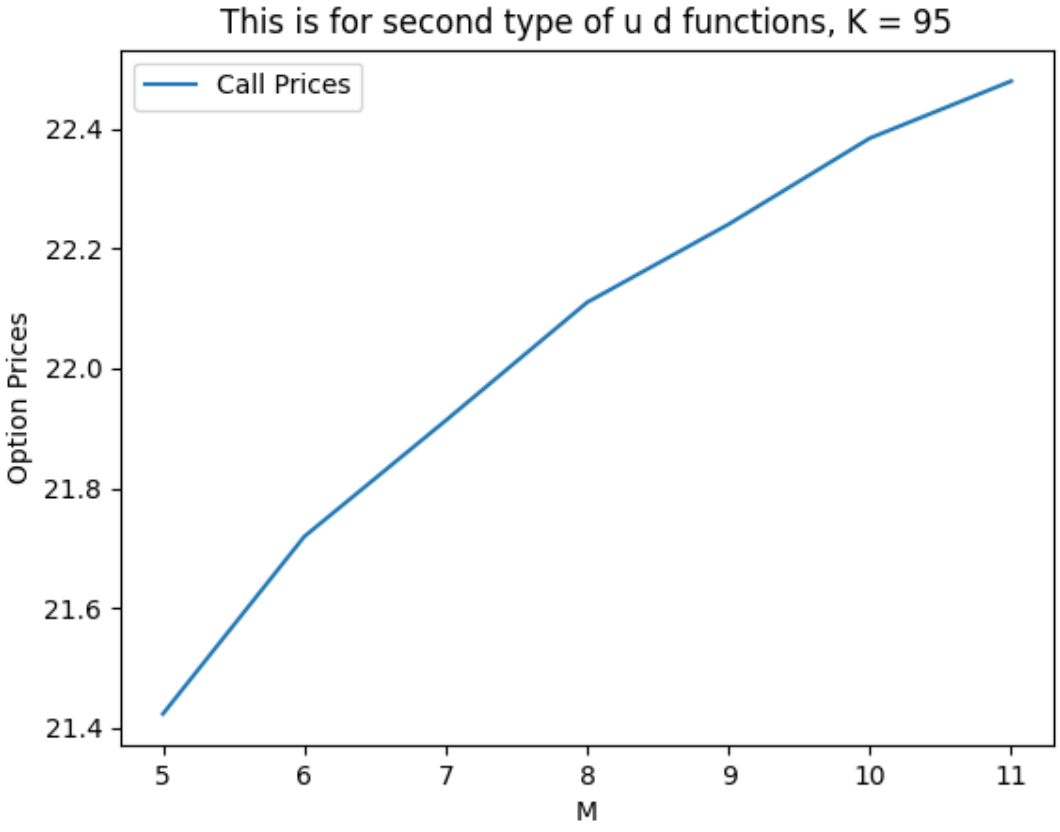
Question 2

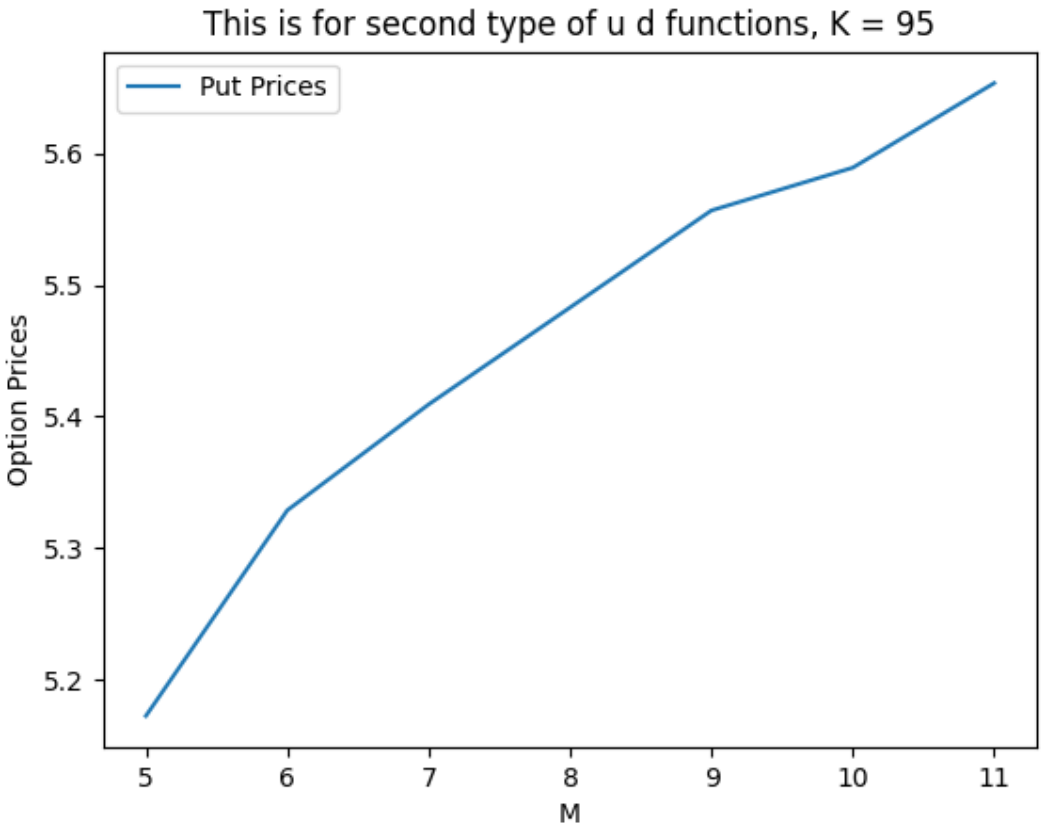
For a path dependent option, I'm using lookback option to do sensitivity analysis.

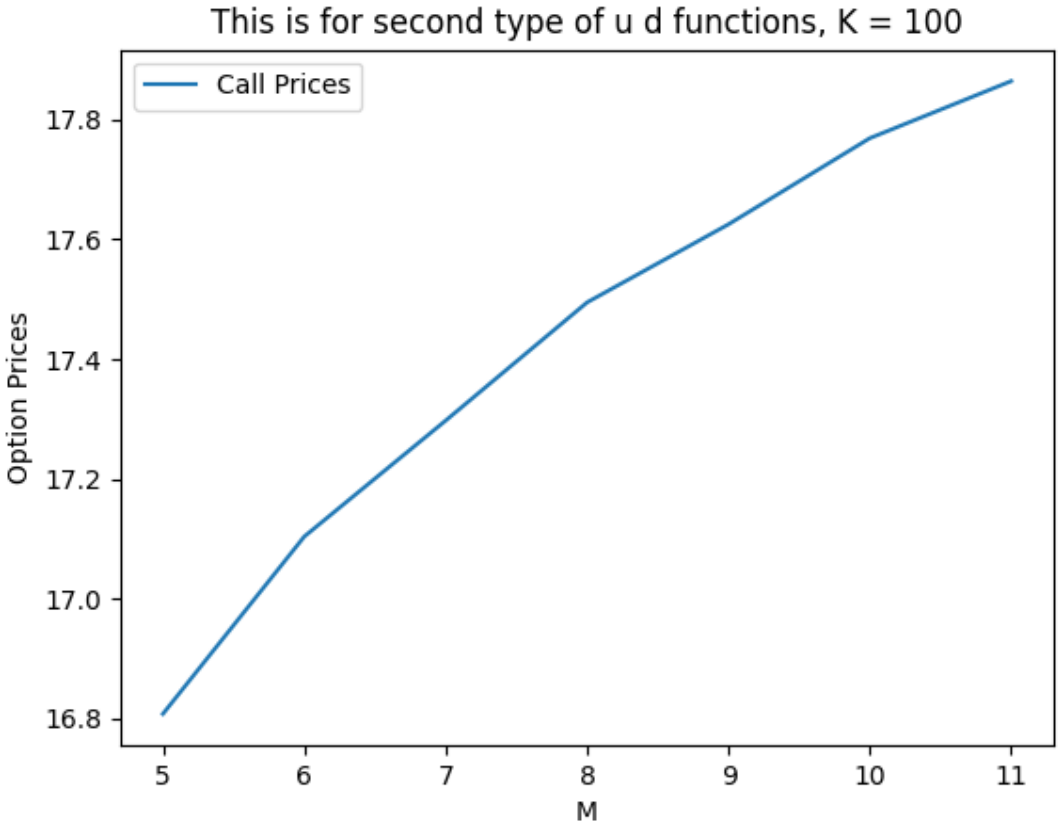
Observation –

1. The lookback option seems to costlier than the European options when we observe the graph of Prices vs K.
2. The option price vs K/S0/r/sigma shows similar observation like question 1.
3. For the variation of, since we didn't have enough points to make a good observation we can't comment on it.


This is for second type of u d functions
Call Prices
Put Prices
Option Prices
0
10
20
30
40
70
80
90
100
110
120
130
K


This is for second type of u d functions, K = 95
Call Prices
Option Prices
21.4
21.6
21.8
22.0
22.2
22.4
5
6
7
8
9
10
11
M


This is for second type of u d functions, K = 95
Put Prices
Option Prices
5.6
5.5
5.4
5.3
5.2
5
6
7
8
9
10
11
M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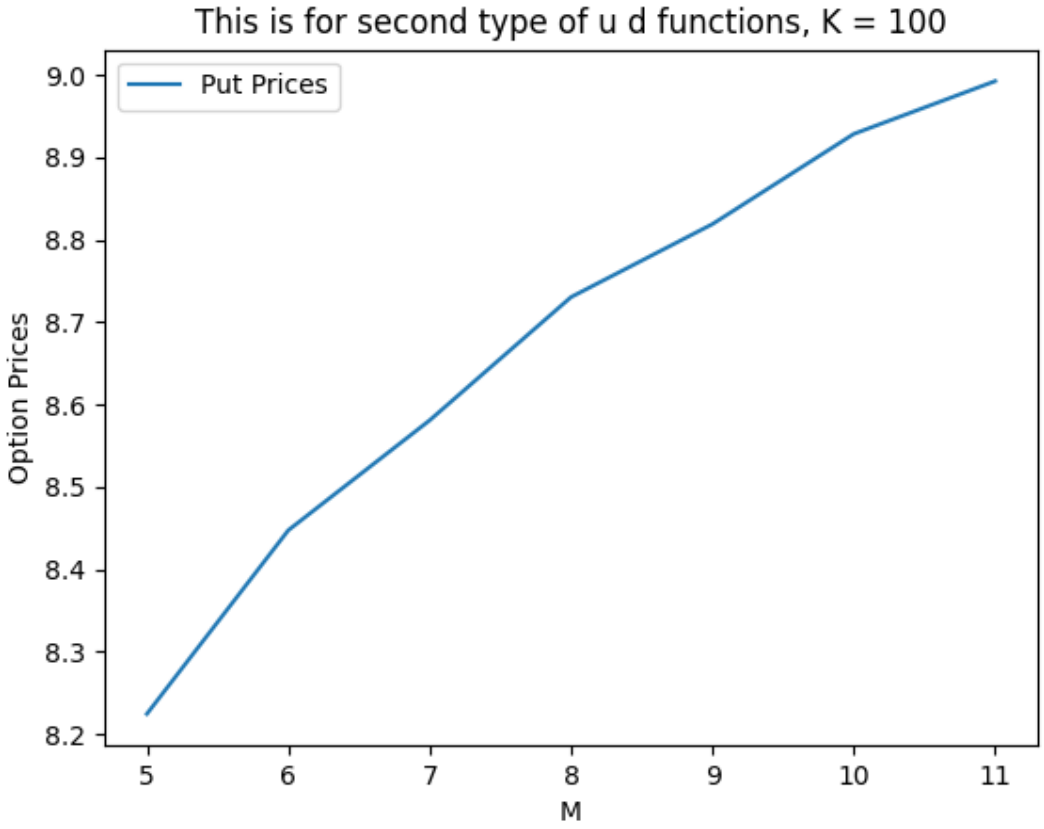
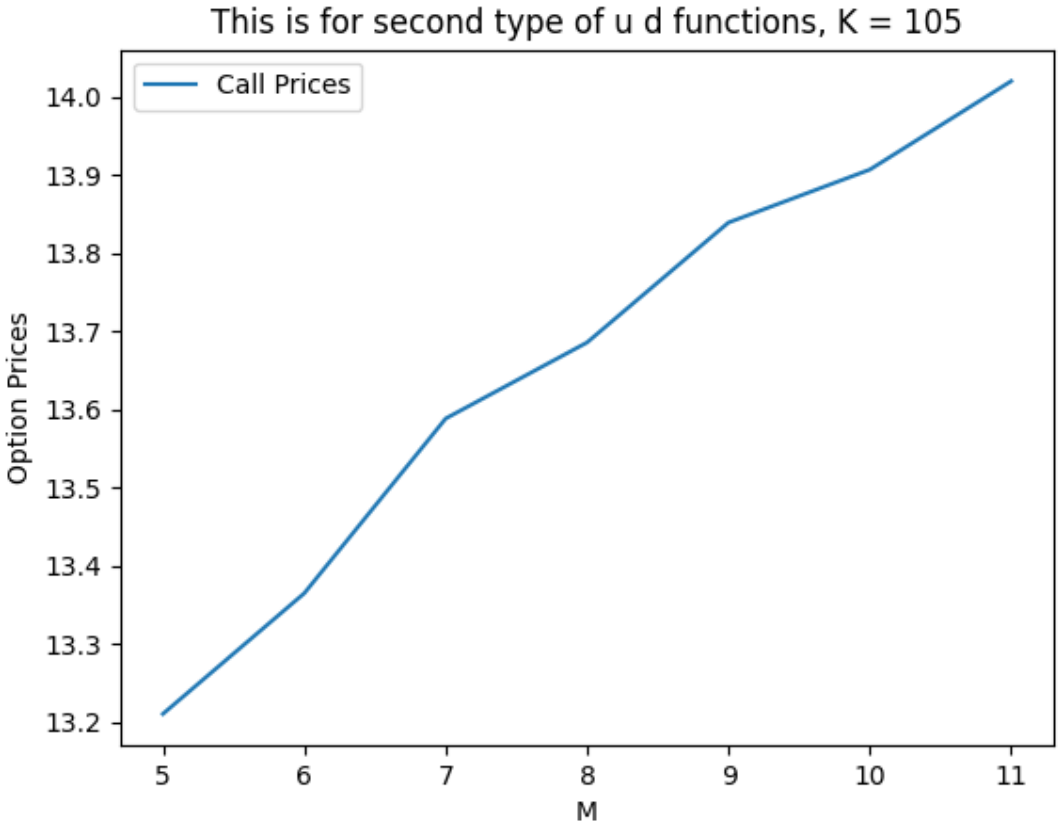
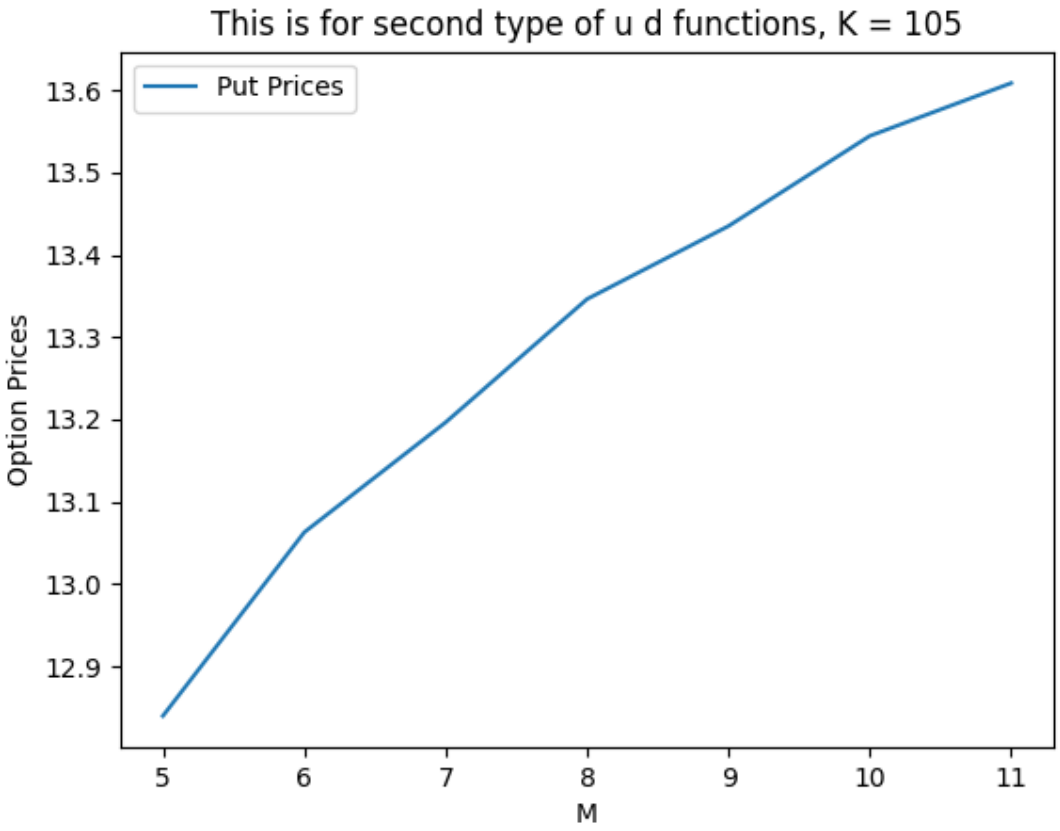
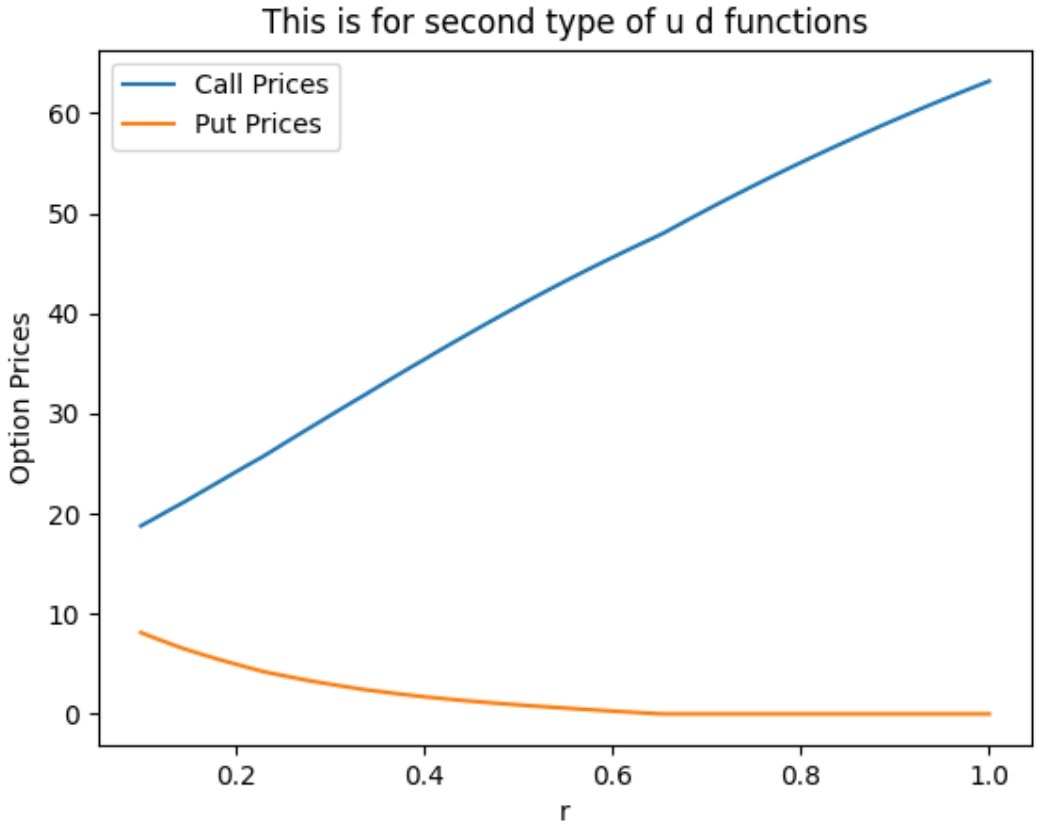
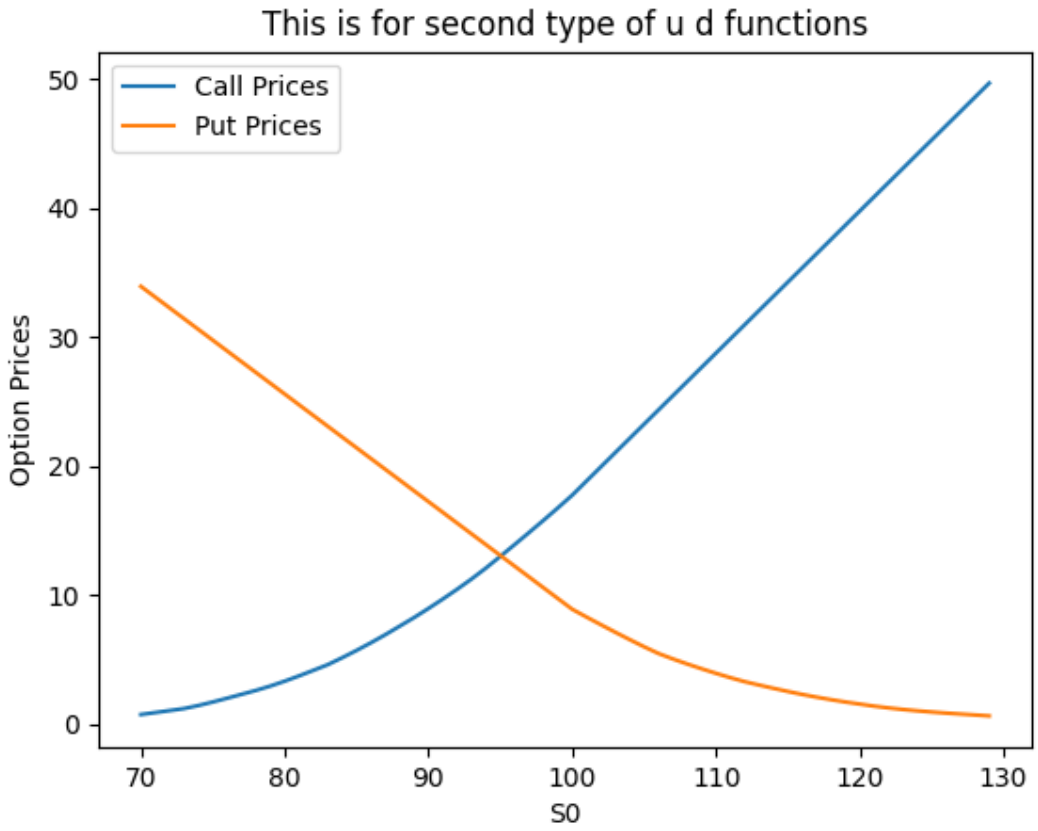
Call Prices
Option Prices
17.8
17.6
17.4
17.2
17.0
16.8
5
6
7
8
9
10
11
M

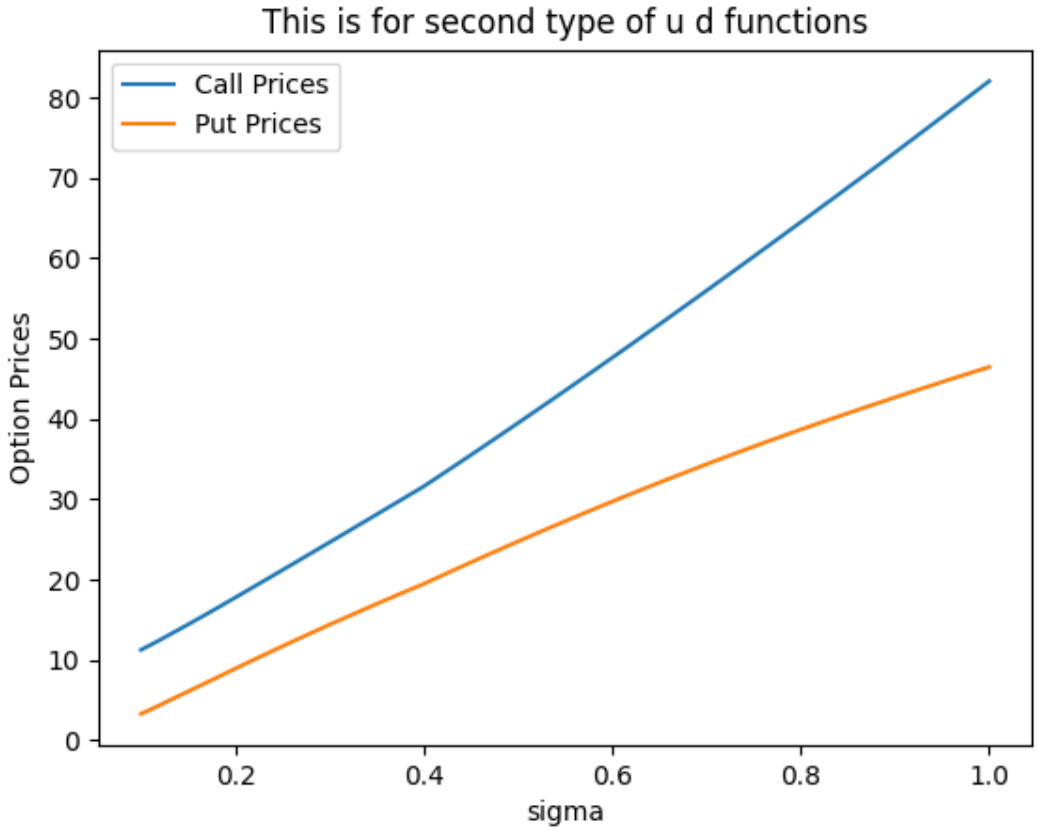

This is for second type of u d functions, K = 100
Put Prices
Option Prices
9.0
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
5
6
7
8
9
10
11
M


This is for second type of u d functions, K = 105
Call Prices
Option Prices
14.0
13.9
13.8
13.7
13.6
13.5
13.4
13.3
13.2
5
6
7
8
9
10
11
M


This is for second type of u d functions, K = 105
Put Prices
Option Prices
M
13.6
13.5
13.4
13.3
13.2
13.1
13.0
12.9
5
6
7
8
9
10
11


This is for second type of u d functions
Call Prices
Put Prices
Option Prices
r
60
50
40
30
20
10
0
0.2
0.4
0.6
0.8
1.0


This is for second type of u d functions
Call Prices
Put Prices
Option Prices
S0
0
10
20
30
40
50
70
80
90
100
110
120
130


This is for second type of u d functions
Call Prices
Put Prices
Option Prices
sigma
0
10
20
30
40
50
60
70
80
0.2
0.4
0.6
0.8
1.0