

Level 9 Homework

Zstar

B. Perpetual American Options

a) & b) . Results:

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PerpetualAmericanOption:  
Call Price: 18.5035  
Put Price: 3.03106
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The result is the same as the answer on the course material.

c). Compute call and put option price for a monotonically increasing range of underlying values of $S[10, 50]$:

S	Call Price	Put Price
100	13.6174	5.48192
101.053	14.0839	5.13641
102.105	14.5614	4.81593
103.158	15.0498	4.51843
104.211	15.5495	4.24206
105.263	16.0604	3.98511
106.316	16.5828	3.74606
107.368	17.1168	3.52349
108.421	17.6626	3.31613
109.474	18.2202	3.1228
110.526	18.7898	2.94243
111.579	19.3716	2.77405
112.632	19.9657	2.61675
113.684	20.5722	2.46971
114.737	21.1913	2.33217
115.789	21.8231	2.20345
116.842	22.4678	2.0829
117.895	23.1255	1.96994
118.947	23.7963	1.86403
120	24.4804	1.76467

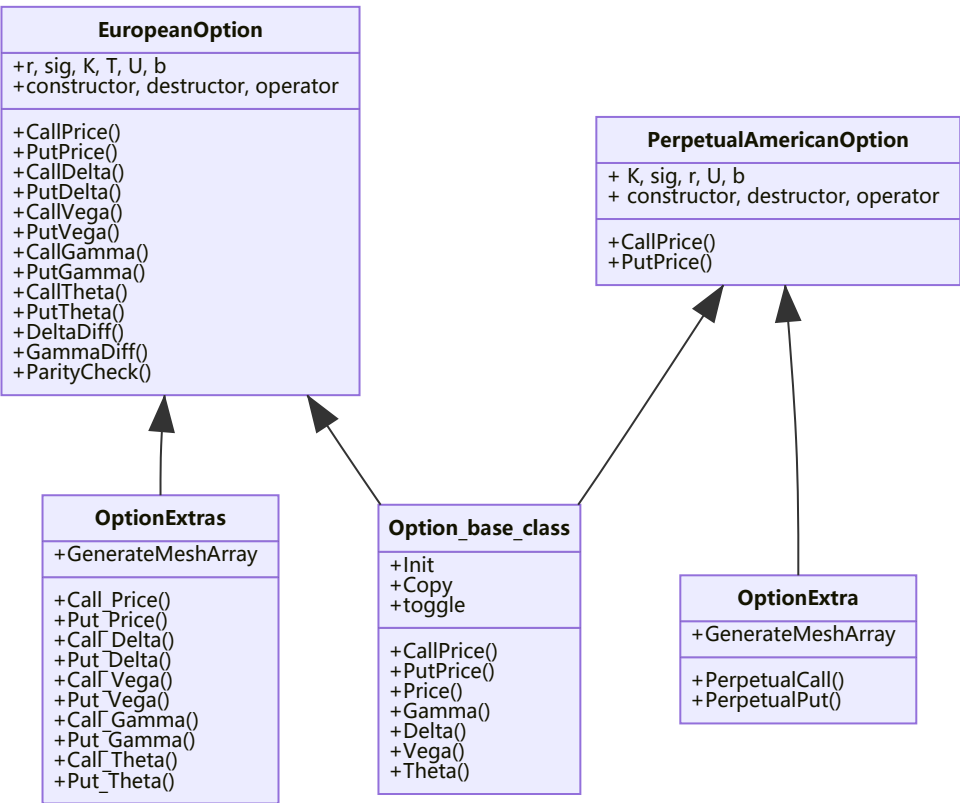
d). Input a matrix of option parameters and receive a matrix of Perpetual American option prices.

Example: $K[100,120]$, $r[0.1, 0.3]$;

K	sigma	r	S	b	Price
100	0.1	0.1	120	0.02	24.4804
101.053	0.1	0.110526	120	0.02	22.968
102.105	0.1	0.121053	120	0.02	21.6114
103.158	0.1	0.131579	120	0.02	20.3702
104.211	0.1	0.142105	120	0.02	19.2181
105.263	0.1	0.152632	120	0.02	18.1379
106.316	0.1	0.163158	120	0.02	17.1176
107.368	0.1	0.173684	120	0.02	16.1492
108.421	0.1	0.184211	120	0.02	15.2272
109.474	0.1	0.194737	120	0.02	14.3476

110.526	0.1	0.205263	120	0.02	13.5076
111.579	0.1	0.215789	120	0.02	12.7053
112.632	0.1	0.226316	120	0.02	11.9391
113.684	0.1	0.236842	120	0.02	11.2078
114.737	0.1	0.247368	120	0.02	10.5105
115.789	0.1	0.257895	120	0.02	9.84625
116.842	0.1	0.268421	120	0.02	9.21428
117.895	0.1	0.278947	120	0.02	8.61381
118.947	0.1	0.289474	120	0.02	8.04405
120	0.1	0.3	120	0.02	7.50419

Jusitifications for Design Decisions



The figure above explicitly illustrates my idea and the organization of different files.