MA 473: Computational Finance

LAB 01 Report

Name: Ramineni Hardhika

RollNo.:220123052

1)

A)

M	Model	European Call	European Put	American Put
5	A	8.1116	4.2674	4.6428
5	B	8.2205	4.3763	4.7523A
10	A	7.7098	3.8656	4.3872
10	B	7.7602	3.9160	4.4383
20	A	7.7822	3.9380	4.4224
20	B	7.8077	3.9635	4.4481

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- American puts are consistently priced higher than European puts.
- B yields slightly higher values compared to A.
- Increasing M improves convergence and pricing precision.

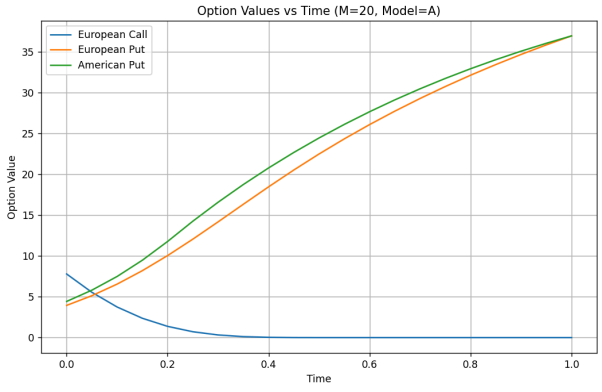
B) Option Prices at times (M = 20, Model = A)

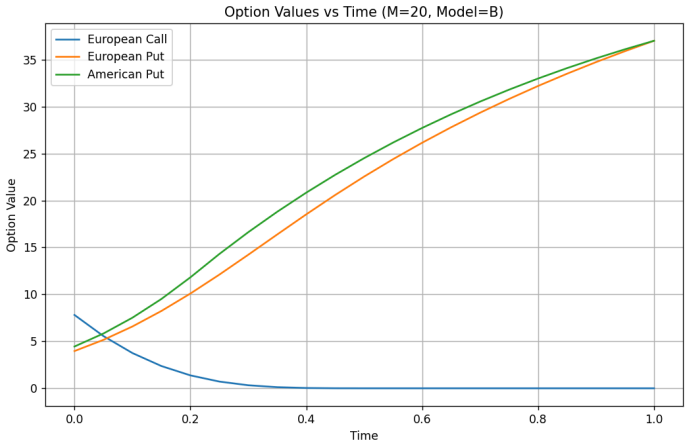
Time	European Call	European Put	American Put
0.00	7.7822	3.9380	4.4224
0.25	0.7126	12.0486	14.2478
0.50	0.0000	22.4750	24.4356
0.75	0.0000	30.7302	31.7203
0.95	0.0000	35.8227	36.0223

Observations:

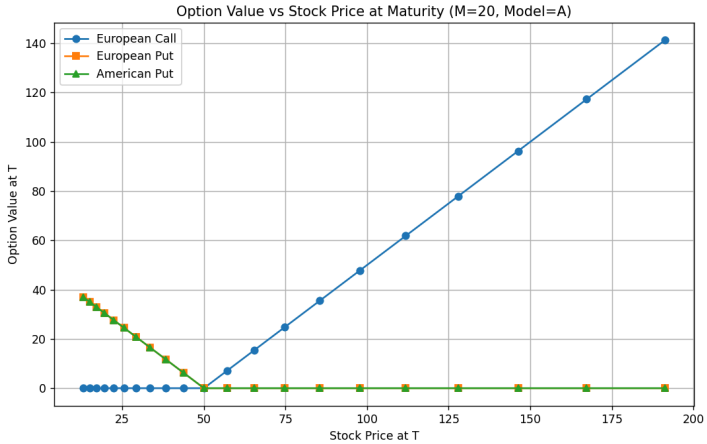
- Call values drop to zero as the stock price falls below the strike.
- Put values rise over time, especially when the stock price stays low.
- American puts maintain a premium throughout the option lifetime.

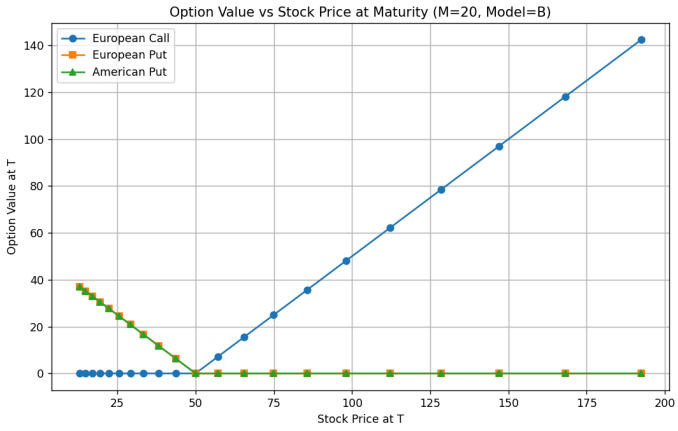
C)





- Option Price vs Stock Price at maturity reflects:





  - European call: increasing curve

- European & American puts: decreasing curves
- American put lies above European put due to early exercise value

CONCLUSION:

The American put option consistently outperforms its European counterpart, particularly when the stock is below the strike price. Model B, with a more advanced volatility adjustment, provides slightly more accurate pricing. As the number of steps increases, results stabilize and converge.