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Rollno.:210123036

Observations:

Q1.

a)

Initial Option Prices:

M = [1,5,10,20,50,100,200,400]

Call:

[43.690448412526614, 41.3548821470121, 41.59075025419635, 41.46340363414048, 41.227779010398905, 41.191561730698616, 41.252253617805884, 41.23137620029618]

Put:

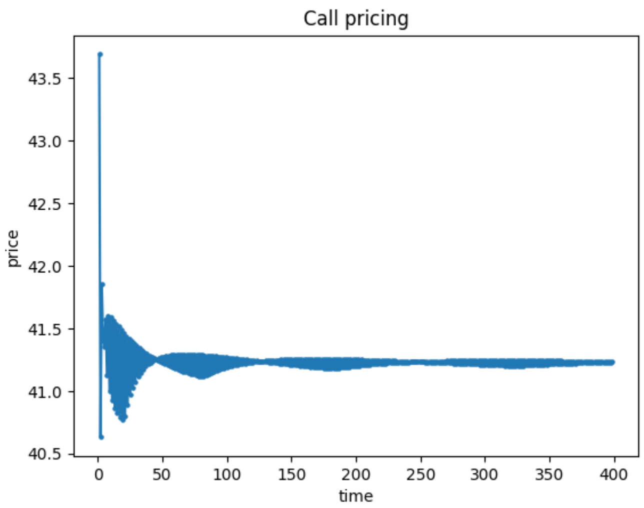
[25.46453063502412, 23.12896436950956, 23.36483247669384, 23.23748585663789, 23.00186123289701, 22.965643953195286, 23.026335840302078, 23.005458422796675]

M may grow as large as possible but the limit of the option prices remain almost constant even for larger values of M.

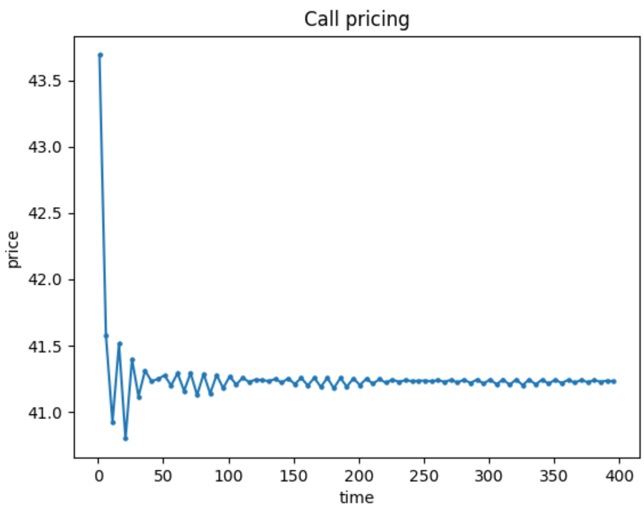
b)

Call Option:

M=1



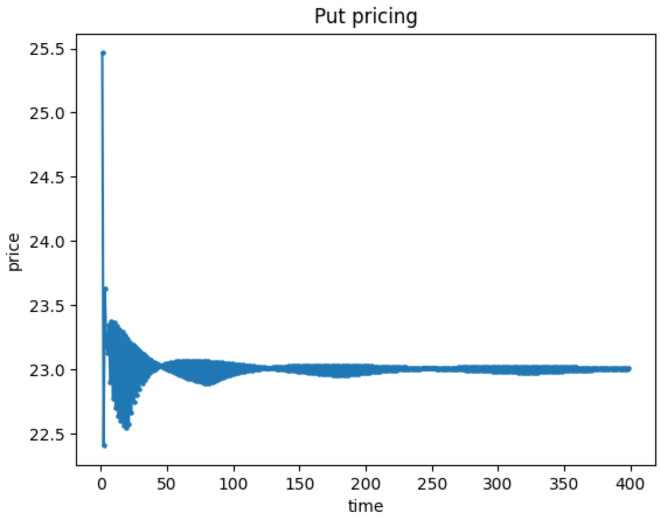
M=5



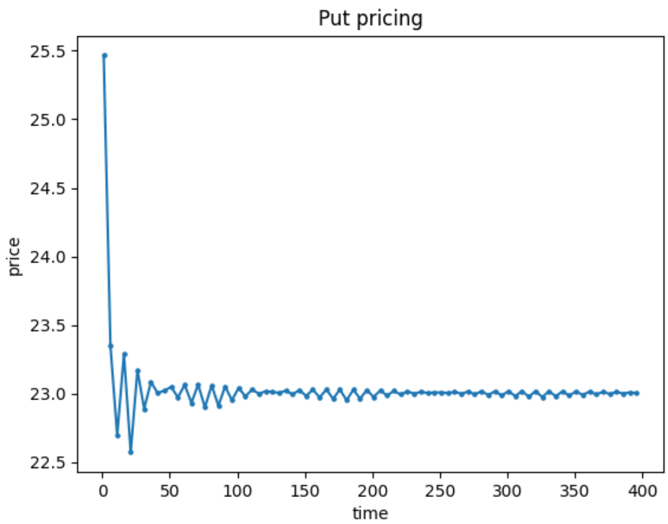
It can be observed that on larger M the call option price converges approximately to 41.23

Put Option:

M=1



M=5



It can be observed that on larger M the put option price converges approximately to 23.

c)

For M=20 and t=[0,0.5,1,1.5,2,3,4.5]

Tabulated prices for Call:

T=0: [41.46340363414048]

T=0.5: [77.09078453271233, 38.0638506946876, 16.75305862070728]

T=1: [136.66911777167155, 72.38970051378962, 34.58437904605692, 14.473871685897674, 5.137161661613103]

T=1.5: [231.4717324152461, 130.63478914024483, 67.55518202765757, 31.01066414031842, 12.1890090691607, 3.936234797654233, 0.9923881628452572]

T=2: [376.47813009794214, 224.00926145613263, 124.49230896591821, 62.55755514488673, 27.324061684813547, 9.906735296230323, 2.820004513647162, 0.5843144626826939, 0.07774197579054708]

T=3: [912.4345366075828, 580.300950959353, 357.7316992516182, 209.12732104553461, 111.8249778107939, 51.891331210268795, 19.500856868227807, 5.421858725949164, 0.9719594807375809, 0.08316015581463827, 0.0, 0.0, 0.0]

T=4.5: [3095.2384365500775, 2041.0386579551873, 1334.3874138366996, 860.7049193480532, 543.1860478361473, 330.3467832671023, 187.67635764298845, 92.04151137070815, 32.5448480784806 8, 5.713813936348766, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]

Tabulated prices for Put:

T=0: [23.23748585663789]

T=0.5: [13.97355535833238, 23.39685970411584, 34.56323351994352]

T=1: [6.659221466368004, 13.58296812064516, 23.506554764394128, 35.389691286754065, 47.49896210264761]

T=1.5: [2.2123778432526384, 6.016623985481663, 13.080103780276234, 23.553903137775137, 36.24956864669556, 49.12348615734707, 60.34128453053499]

T=2: [0.3934405237603969, 1.7067624621479967, 5.273095041112715, 12.437133613158329, 23.521945851019698, 37.15270827016877, 50.87813380650333, 62.59324933733672, 71.43818149026956]

T=3: [0.0, 0.0, 0.06654871396863261, 0.6994104957427497, 3.4337808398945477, 10.556748690826733, 23.115667234880718, 39.1671482012833, 54.91431309927878, 67.56401074061515, 76.55597649447681, 82.63921531203026, 86.71693223625849]

T=4.5: [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 4.609291263618751, 20.749763530520262, 43.84061174849554, 63.14895420982308, 76.09172321737206, 84.76752073434093, 90.58308172531139, 94.48136883650177, 97.09446883233504, 98.84608214183775, 100.0202236561002З]