Option Valuation Project

1. Monte Carlo Simulation

(a) (20 points) Compute the price of the following options using Monte Carlo Simulation with the sample size 250 or larger.

1. Asian call
2. Asian put
3. Lookback call
4. Lookback put
5. Floating lookback call
6. Floating lookback put

Assume that the risk-free rate is 2%, the underlying stock has the current price $100, and volatility 25%, with no dividend payments. All the options have a strike price $105 and the maturity 2 months. The simulation has the unit time = 1 week.

(b) (30 points) Also price an American put option using Monte Carlo Simulation

2. Lattice

Solve Question 1 again using the lattice approach.

(c) (20 points) Compute the price of the following options using the lattice approach.

1. Asian call
2. Asian put
3. Lookback call
4. Lookback put
5. Floating lookback call
6. Floating lookback put

Assume that the risk-free rate is 2%, the underlying stock has the current price $100, and volatility 25%, with no dividend payments. All the options have a strike price $105 and the maturity 2 months. The lattice has the unit time = 1 week.

(d) (30 points) Also price an American put option using the lattice approach.

Deliverable: either 1 or 2

1. Jupyter Notebook with python codes embedded
2. A report (up to 25 pages) with python codes or any other implementation as a separate submission

Both will have to follow the guidelines as follows:

A. Summary (250~300 words)
B. Methods
    a. Monte Carlo 1 (500~750 words)
    b. Lattice (500~750 words)
C. Explanation of major functions in the code (500~750 words)
D. Visualization of the solutions, intermediate calculation if applicable (150~200 words)
E. Comparison between the two methods and dicussion (250~300 words)
F. Lessons learned (100~150 words)