# Hw6 Arithmetic Average

**Description:**

Use Monte Carlo simulation and the binomial tree model to calculate the European arithmetic average option prices, respectively. The American arithmetic average option prices are also required in the case of the binomial tree model.

**User Manual:**

Double click “Hw6 Arithmetic Average.exe”

→Click “Input” at the upper left corner of the window

→Input the following parameters in the dialogue box:

Pricing Method: Use Monte Carlo simulation (Monte Carlo) or the binomial tree model (Binomial Tree). If “Monte Carlo” is checked, specify the number of outer simulation (m). Choose whether the control variates approach is applied (With) or not (Without). If “Binomial Tree” is checked, specify the number of time steps (n) and the number of arithmetic average prices at each node (p). Regardless of the settings, the window will always show the unimproved outcome. If “Show All” is checked, four other outcomes will be displayed as well, one of them using the binary search only and the other three using the Pascal method, inserting the strike price, and using log-space partition, respectively, with the binary search. If any of “Pascal”, “Insert K”, “Log-Space”, or “Binary” is checked, one more outcome will be shown, which depends on the checked items. For example, if all of the four items are checked, the Pascal method (Pascal), strike price inserting (Insert K), log-space partition (Log-Space), and the binary search (Binary) will be considered in the calculation of the option price.

Option Type: Call option (Call) or put option (Put)

S: Current stock price

K: Strike price

r: One-year risk-free interest rate (e.g., 10% => r = 0.1)

T: Expiration date (e.g., 6 months => T = 0.5)

Sigma: One-year volatility (e.g., 30% => Sigma = 0.3)

q: One-year dividend yield (e.g., 2% => q = 0.02)

Save: Realized arithmetic average price

T’: Time which has elapsed since the option was issued (e.g., 6 months has passed since the option was issued => T’ = 0.5)

→Click “OK” at the lower right corner of the dialogue box (or “Cancel” if you would like to exit the dialogue box)

→Calculation result will be shown on the display area of the window

→If you would like to perform another calculation, click “Input” at the upper left corner and repeat the process

above. (The dialogue box will save the parameters you input last time.) Or you can click “X” at the upper right corner of the window to exit the program.