End User Instructions

February 2022

1 Introduction

This is an end-user guidance document. It is intended to be a guide to the proper use of this implementation, select functions, configure parameters, and interpret the displayed results. The main code provides capabilities to calculate the following:

1. Asian call options: $\dfrac{1}{(1+R)^N} E\left(\max(A(0,N)-K,0)\right)$

2. Asian put options: $\dfrac{1}{(1+R)^N} E\left(\max(K-A(0,N),0)\right)$

with arithmetic $\left(A(0,N)=\frac{1}{N}\sum_{i=1}^{N} S(i)\right)$ and geometric $\left(A(0,N)=\left(\prod_{i=1}^{N} S(i)\right)^{\frac{1}{N}}\right)$ averaging on an underlying asset driven by a binomial model in discrete time.

2 How to input data

The main code works in a text terminal and can be called by excuting the "main" binary (e.g., *project1.exe* in "./bin/Debug" directory).

```
cd ./bin/Debug # or cd ./bin/Release
project1.exe
```

The binomial model's parameters (S0, U, D, R) have to be provided as the terminal prompted and must be valid (see the table 1) otherwise the terminal will prompts the error message (see the figure 1).

Paramters	Conditions
S0,N,K	greater than 0.0
U	-1 < U and D < U
D	-1 < D and D < U
R	-1 < R and D < R < U

Table 1: Input parameters check conditions

Figure 1: Top left: Terminal showing an error due to arbitrage exists. Top-middle: Error due to invalid data range. Top right: The input is correct. Bottom: Error due to invalid data range in time step or strike price.

After the parameters were verified, the terminal will ask for the number of time steps (N) and the strike price (K). This parameters must be valid (see the table 1) and then the terminal will displayed the Asian call/put options with arithmetic and geometric averaging.

```
Enter S0: 1
Enter U: 1
Enter D: 0
Enter R: 0.5

Input data checked
There is no arbitrage

Enter N: 3
Enter K: 2

In case of arithmetic mean
Asian call option price = 0.185185

Asian put option price = 0.0740741

In case of geometric mean
Asian call option price = 0.136839

Asian put option price = 0.0797288
```