

Homework 2

Due date: Next Friday, September 11, 2015

1. Design a payoff class for a European Power option.

Power option's payoff is based on the price of an underlying asset raised to the power i where i is an integer parameter greater than 1.

$$\text{payoff}(\text{call}) = \max(S^i - K, 0)$$

$$\text{payoff}(\text{put}) = \max(K - S^i, 0)$$

where K is the strike price, S is the underlying price at the expiration date.

2. Design a payoff class for a fixed strike European-style Asian call option where the payoff is defined with respect to the arithmetic average of the underlying prices from time 0 to the maturity time. Specifically, the payoff is determined by the difference between the arithmetic average of the underlying price over the entire life of the option and the strike price.

For instance,

$$\text{payoff}(\text{call}) = \max(S_{\text{ave}} - K, 0)$$

where K is the strike price and the maturity is T , S_{ave} is the arithmetic average of underlying price over time interval $[0, T]$.

A sample header file "PayoffAsian.h" is provided.

3. On Aug 3, 2015, you purchased a fixed strike one-month European Asian call option contract on Apple Inc. (NASDAQ: AAPL). The strike price is 105 USD. The payoff depends on the arithmetic average daily close price during the calendar month (Aug, 2015). Using the AAPL stock price file (provided on $T - \text{Square}$), calculate the payoff of this contract based on the payoff class you developed in problem 2.