AMS-511 Foundations of Quantitative Finance

Fall 2020 — Assignment 08

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Question 1.

An *lookback* option is a path dependent option whose value is based on some function of the underlying's price history over the life of the option/ rather than the price at expiry. Read the Wikipedia article https://en.wikipedi-a.org/wiki/Lookback_option which describes these options in detail.

There are many possible forms; however, the particular case for this assignment is a lookback put with:

$$P(T) = \max\left[\max_{t}[S(t)] - S(T),\, 0\right] = S_{\max} - S(T)$$

Assume a stock with price $S(0) = \$96.25$ and volatility $\sigma = 28\%$, and a risk free rate $r_f = 0.5\%$. Use a Monte Carlo simulation to price the lookback option above for an expiry of $T = 0.75$. Compare your solution to that returned by FinancialDerivative[ ].

Note: The corresponding *Mathematica* solution is identified as a {"LookbackFloating", "European", "Put"}. Use the Mathematica documentation to determine the required parameters for FinancialDerivative[ ].