Homework 5

May 2019

1 Exotic Options

a.) An up-and-out barrier call option is a call option on a stock whose beginning price S_0 is below a threshold y. If the stock price before expiry T hits the threshold y, the option immediately "expires," i.e. the owner cannot exercise. Price a barrier option numerically, i.e. using Monte Carlo simulation, where

$$S_0 = 100$$
$$\sigma = 10$$
$$T = 30$$
$$y = 140$$
$$K = 95$$
$$r = .01$$

Note K is the strike price, r is the risk-free rate, and σ is the volatility of the stock. Here, we assume this option is European.

b.) An Asian call option allows the holder to purchase an underlying stock at the average underlying price between time 0 and the time of exercise T. Using the same parameters above (except K and y), compute the fair price of an Asian call option.

PLEASE NOTE: you must simulate many paths to gain accuracy in these calculations.