CS401: Computational Finance

Lab 5

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Q1. Barrier Option

The down and in option would be executed when the stock price would go below a certain barrier whereas the down and out option would be cancelled when the stock price would go below a certain threshold.

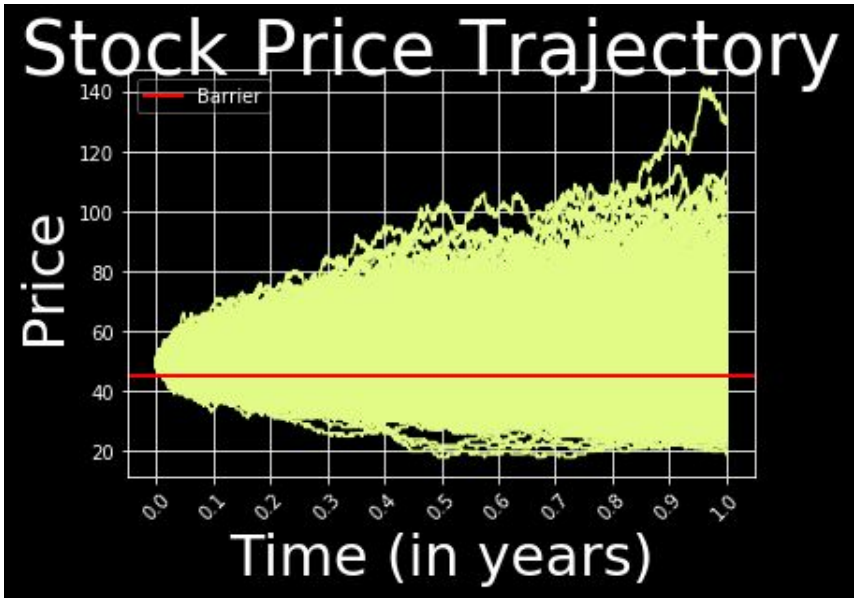
On exercising a barrier option using the given parameters we get the following output:

Pricing a down and in option

Parameters of Barrier Option Pricer:

Underlying Asset Price = 50
Volatility = 0.3
Risk-Free 10 Year Treasury Rate = 0.05
Years Until Expiration = 1.0
Time-Step = 0.001
Discrete time points = 1000.0
Number of Simulations = 1000

Call Price: 7.1256

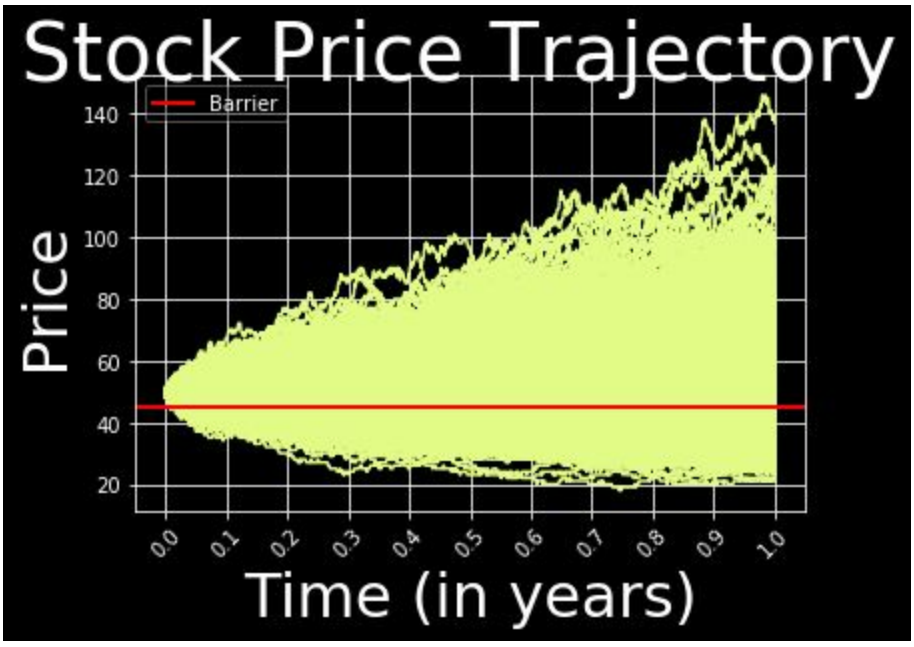


Pricing a down and out option

Parameters of Barrier Option Pricer:

Underlying Asset Price = 50
Volatility = 0.3
Risk-Free 10 Year Treasury Rate = 0.05
Years Until Expiration = 1.0
Time-Step = 0.001
Discrete time points = 1000.0
Number of Simulations = 1000

Call Price: 0.0000



- Down in will give us 0 whereas down out will give us 7.1256
- All the stock prices remain above the barrier as a result the down in valuation would be 0.
- Value of the European Call Option is 7.131 using the Monte Carlo BSM simulation which is very close to the value of down-in + down-out

Q2. American Options

These options can be exercised at any point of time. The **value of an American Option** with given parameters using the finite difference method is **4.07**.