Assignment #5

Monte Carlo for American Options

Required materials: Python

Directions:

1. Use python to collect options chain data for an actively traded American put option in real time from Yahoo! Finance (or another available data service that provides real time or slightly delayed options quotes).
    a. Plot the implied volatilities
    b. Price the options chain under the assumption that they are European options. That is, use the standard Black-Scholes model with a dividend yield if one is paid.
    c. Price the American options chain using the Cox, Rubenstein, and Ross binomial tree options pricing model with ≥ 200 steps per options series tree.
    d. Price the American options chain using Monte Carlo simulations with ≥ 500 simulations per option series.
2. Create a table showing the root mean squared error for each of the pricing methods for the options chain.
    a. Which pricing method prices the options most accurately?
3. Vary the number of steps in the CRR model and the number of simulations used for the Monte Carlo method.
    a. How does the accuracy of the model-implied option price vary with the number of steps and the number of simulations used?