Homework 2

1. Suppose that we have an Asian call option whose strike price K = 30, and the stock price is currently at $30 as well. The option expires in 12 months. Furthermore, suppose that the volatility of the stock is 35% per annum and the risk-free interest rate is 3% per annum.
   (a) Suppose that there are totally 252 trading days in the 12 months period and the option depends on the average of the closing prices of all trading days. Using a Monte Carlo method with 10000 replications to determine the price of the option and compute a 95% confidence interval.
   (b) Compute the values of delta and vega by using the pathwise method and the value of gamma by using the likelihood ratio method on delta.

2. Suppose that we have an American put option whose strike price K = 30, and the stock price is currently at $30 as well. The option expires in 12 months. Furthermore, suppose that the volatility of the stock is 35% per annum and the risk-free interest rate is 3% per annum. Use the Longstaff-Schwartz method to determine the price of the option. You may use 10000 replications, 252 time intervals and use polynomials up to order 4 as basis functions.

The homework is due on November 27. You may hand it in to the professor before the class starts.