**Assignment 3 – Derivative Securities**

The assignment is to be done individually. Show your work thoroughly and post your MATLAB code to t-square. Unless, it will be assumed that you did not solve it.

1. The stock follows the GBM as where μ=0.05,σ=0.25. And, the risk free rate is 3% (annualized continuously compounded yield). You are the CEO of the company whose stock is the underlying asset. You know that the company will compensates you with the payoff 1000\*max( S\_T – 1500 , 0). You are worried about the risk of your compensation. With the underlying stock and the following two options, construct the zero-investment portfolio such that if you hold the portfolio in addition to your compensation plan, you can erase the delta and gamma risk of your aggregate portfolio - including the compensation plan.
   1. Available options : Call with K=1200, T=1 and Put with K=1600, T=3

Plot the value of hedged portfolio as a function of stock price along with your original compensation plan.

1. The stock follows the GBM as where . And, the risk free rate is 3% (annualized continuously compounded yield). Find the value of American put option with T=0.5 when S\_0=100 for different level of K=S\_0\*exp( and find the critical level of K\* such that if K > K\*, it is optimal to exercise the American put option right now.