

1. Consider an asset which follows a GBM with drift $\mu = 10\%$ and volatility $\sigma = 20\%$. Assume that the risk free rate is $r = 5\%$. The initial asset price at time $t = 0$ is $S(0) = 100$.

Simulate 10 different paths of the asset price making use of the GBM, in both the real and the risk-neutral worlds.

Now compute the price of a six month fixed-strike Asian option with a strike price of 105 (using arithmetic average). Do the pricing for both call and put options, using Monte Carlo simulation.

Repeat the above exercise with strike price $K = 110$ and $K = 90$. How do your results compare ?

Now do a sensitivity analysis of the option prices.

2. Compute the prices of the Asian options given above by employing variance reduction techniques also and compare your results.