Derivatives Lab

Session 12

October 31, 2011

1. Compute an ensemble of standard Brownian paths $W(t)$ over the interval $[0, 1]$. Empirically determine mean and variance $W(1)$.

2. Compute an ensemble of geometric Brownian paths

$$S(t) = \exp((\mu - \tfrac{1}{2}\sigma^2)\, t + \sigma\, W(t))$$

and compute mean and variance of $S(1)$.

3. Compute the corresponding stock price paths which underlie the binomial tree model and compare your results with Problem 2.

4. Use the paths so obtained in a Monte–Carlo valuation of a European call option. Compare your result against the Black–Scholes price.