

### 2.14 Programming

Write a C/C++ function to value a European-style Asian option with a *fixed strike*. That is, the strike price is fixed, but the payoff is based on comparing the strike price to the average closing price over some number of days before expiry. Assume no dividends. (Hint: Use the example in 2.15 as a guide.)

Note: Like 2.15, solution shown is for a call.

```

/* Monte Carlo simulation
 * of an Asian call option
 * (European exercise style)
 * fixed strike
 */
#include <iostream>
#include <math.h>
#include "myfunctions.cpp"
int main(){
    int seed,ctr0,ctr1,tdays,xdays;
    double mynormsim[1000], rc, sigma, S0, K, retval, Sx;
    std::cout << "input seed: ";
    std::cin >> seed;
    std::cout << "input risk-free rate (rc): ";
    std::cin >> rc;
    std::cout << "input starting share price (S0): ";
    std::cin >> S0;
    std::cout << "input strike price (K): ";
    std::cin >> K;
    std::cout << "input volatility (sigma): ";
    std::cin >> sigma;
    std::cout << "input time to maturity in days: (tdays < 1000)";
    std::cin >> tdays;
    std::cout << "At strike, K is matched to average price ";
    std::cout << "over xdays days say.";
    std::cout << "How many days is xdays? "
    std::cin >> xdays;
    srand(seed);
    retval=0.0;
    for (ctr0=0; ctr0<=1000000; ctr0++){
        mynormsim[0]=S0;
        Sx = 0.0;
        for (ctr1=1; ctr1<=tdays; ctr1++){
            mynormsim[ctr1]=mynormsim[ctr1-1]*
                exp(simdeltas(rc, sigma, 1.0/365.0));
            if (ctr1 > tdays - xdays){
                Sx = Sx + (mynormsim[ctr1]/xdays);
            }
        }
        if (Sx > K){
            retval = retval + ((Sx-K)/1000000.0);
        }
    }
    std::cout << "call value = " <<
        exp(-rc*tdays/365.0)*retval << std::endl;
}

```