

# Solutions

## European Call Options

The following MATLAB script solves this problem:

```
calput = 'C';
x = 5.0;
s1 = 4.9;
t = 20.0/52;
sigma = 0.2;
r = 0.05;
q = 0.0;

[p1, delta, gamma, vega, theta, rho, crho, vanna, ...
 charm, speed, colour, zomma, vomma, ifail] = ...
    s30ab(calput, x, s1, t, sigma, r, q);

p1
delta

s2 = 4.95;
t = 19.0/52;
[p2, ifail] = s30aa(calput, x, s2, t, sigma, r, q);

p2

netgain = (p1 - p2 + delta*s2 - delta*s1 * (1 + r/52)) * 100000
```

## Heston's Stochastic Volatility Model

The following MATLAB script solves this problem:

```
x = 100;
s = 100;
t = 1:15;
sigmav = 0.5751;
kappa = 1.5768;
corr = -0.5711;
var0 = 0.0175;
eta = 0.0398;
r = 0.025;
q = 0.0;
gamma = 1.0;
```

```
[p, ifail] = s30na(calput, x, s, t, sigmav, kappa, corr, ...  
                  var0, eta, gamma, r, q);  
  
plot(t,p)  
xlabel('time')  
ylabel('Price of Call')
```

