Problem1

2.

function [payoff] = f(S)

if S >= 20

payoff =20-0.2;

else

payoff = max(0,S-0.2)-max(0,S-20);

end

end

function [price] = Trinomial(S0,T,n,r)

deltat = T/n;

u = 2;

d = 0.5;

low = r\*deltat/(u-1);

high = (u-1+u\*r\*deltat)/(u^2-1);

pos = 1;

for qu = low:0.0001:high

qd = 2\*(qu-r\*deltat);

qm = 1-qu-qd;

sigma = qu\*(u-(1+r\*deltat))^2+(1-qu-qd)\*(r\*deltat)^2+qd\*(d-(1+r\*deltat))^2;

if (sigma >= 0.5^2) & (sigma <= 0.8^2)

fprintf('ok')

else

continue

end

for j = 1:n

for i = 1:2\*j+1

s(j,i)=S0\*u^(max(j+1-i,0))\*d^(max(i-1-j,0));

end

end

p = zeros(n,2\*n+1);

for w = 1:2\*n+1

p(n,w) = f(s(n,w));

end

for g = n-1:-1:1

for h = 1:2\*g+1

p(g,h) = (qu\*p(g+1,h)+qm\*p(g+1,h+1) + qd\*p(g+1,h+2))/(1+r\*deltat);

end

end

price(pos) = (qu\*p(1,1)+qm\*p(1,2)+qd\*p(1,3))/(1+r\*deltat);

allq(pos) = qu;

pos = pos+1;

fprintf('%f',i)

end

end

Problem 2

5.

function [payoff] = f2(S)

if (S >0) & (S <= 1)

payoff = max(0,S - 0.5);

else if (S>1) &(S<=1.5)

payoff = 0.5;

else

payoff = max(0,2-S);

end

end

function [price] = BinomialAmer(S0,T,n,r)

deltat = T/n;

u = 1.1;

d = 0.9;

qu = (1+r\*deltat-d)/(u-d);

qd = 1-qu;

for j = 1:n

for i = 1:j+1

s(j,i)=S0\*u^(j+1-i)\*d^(i-1);

option(j,i)= f2(s(j,i));

end

end

p = zeros(n,n+1);

for w = 1:n+1

p(n,w) = option(n,w);

end

for g = n-1:-1:1

for h = 1:g+1

p(g,h) = max(option(g,h),(qu\*p(g+1,h) + qd\*p(g+1,h+1))/(1+r\*deltat));

end

end

price = max(f2(S0),(qu\*p(1,1)+qd\*p(1,2))/(1+r\*deltat));

end