Homework 9 20516287-Leung Ko Tsun

Q1

The value of the forward contract is the spot price of the underlying asset minus the present value of the forward price, while the forward price is the strike price at which the present value of the forward contract is zero.

Q2

We note that implies or

Or .

Also,

Therefore, we have

Q3

From the equation, we have

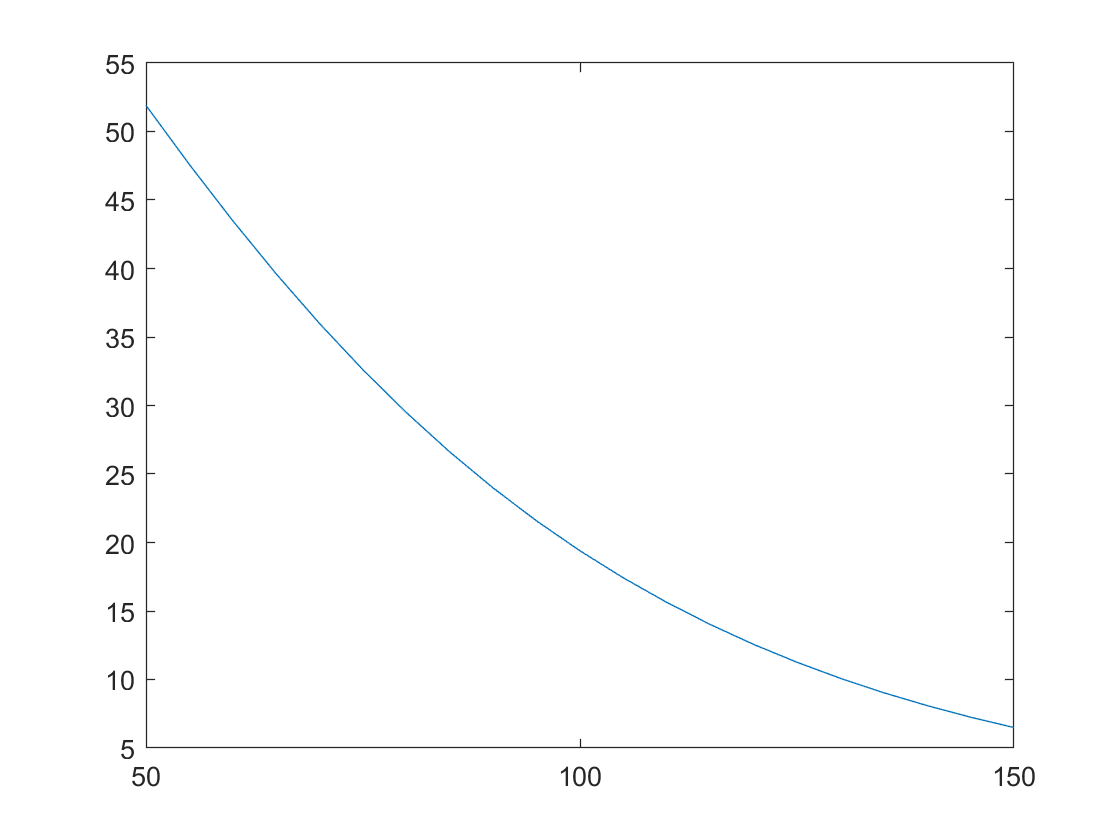
Therefore

Q4

Using the following code, we can plot two graphs of call and put options across strikes:

sig=0.47;F=100; T=1;  
  
dK=5;  
K=50:dK:150;  
CP=zeros(size(K));  
DCF=0.98;  
for i=1:length(K)  
Ki=K(i);  
CP(i)=call2(F,Ki,T,sig,DCF);  
end  
plot(K,CP)  
  
  
for i=1:length(K)  
Ki=K(i);  
PP(i)=put2(F,Ki,T,sig,DCF);  
end  
plot(K,PP)  
  
function x=call2(F,K,T,sig,DCF)  
if T\*sig == 0  
x=max(F-K,0); return;  
end  
d1=log(F/K)+0.5\*(sig^2)\*T;  
d1=d1/(sig\*sqrt(T));  
d2=d1-sig\*sqrt(T);  
nd1=0.5\*(1+erf(d1/sqrt(2)));  
nd2=0.5\*(1+erf(d2/sqrt(2)));  
x=F\*nd1-DCF\*K\*nd2;  
return;  
end  
function x=put2(F,K,T,sig,DCF)  
if T\*sig == 0  
x=max(K-F,0);  
return;  
end  
d1=log(F/K)+0.5\*(sig^2)\*T;  
d1=d1/(sig\*sqrt(T));  
d2=d1-sig\*sqrt(T);  
nd1=0.5\*(1+erf(-d1/sqrt(2)));  
nd2=0.5\*(1+erf(-d2/sqrt(2)));  
x=DCF\*K\*nd2-F\*nd1;  
return  
end

Call:



Put

