MA 374 Lab 7 report

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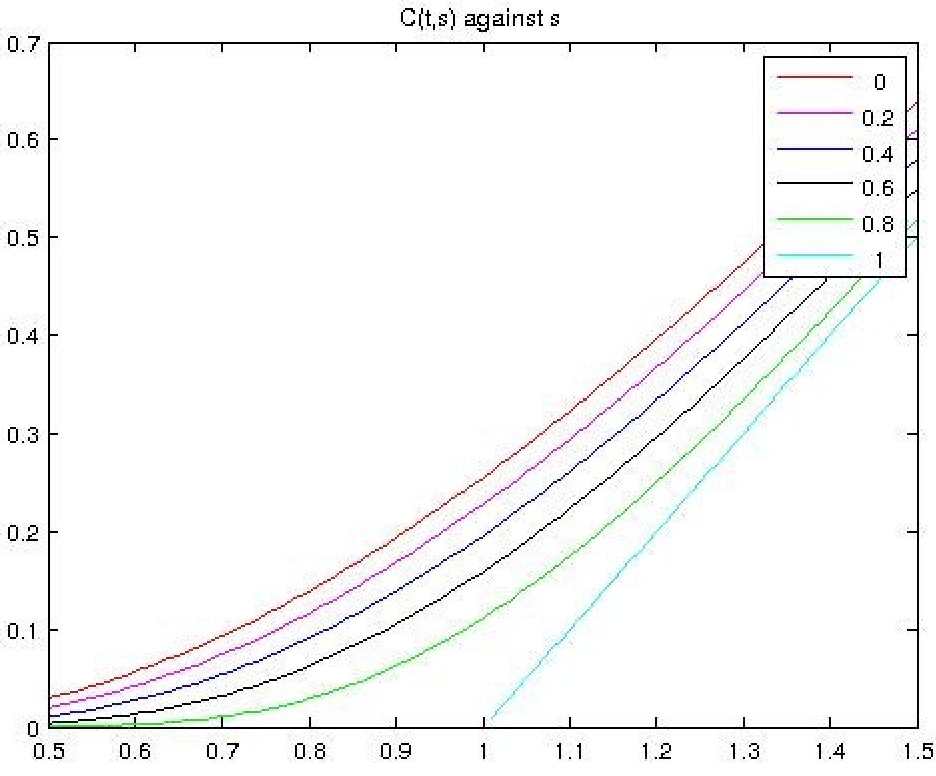
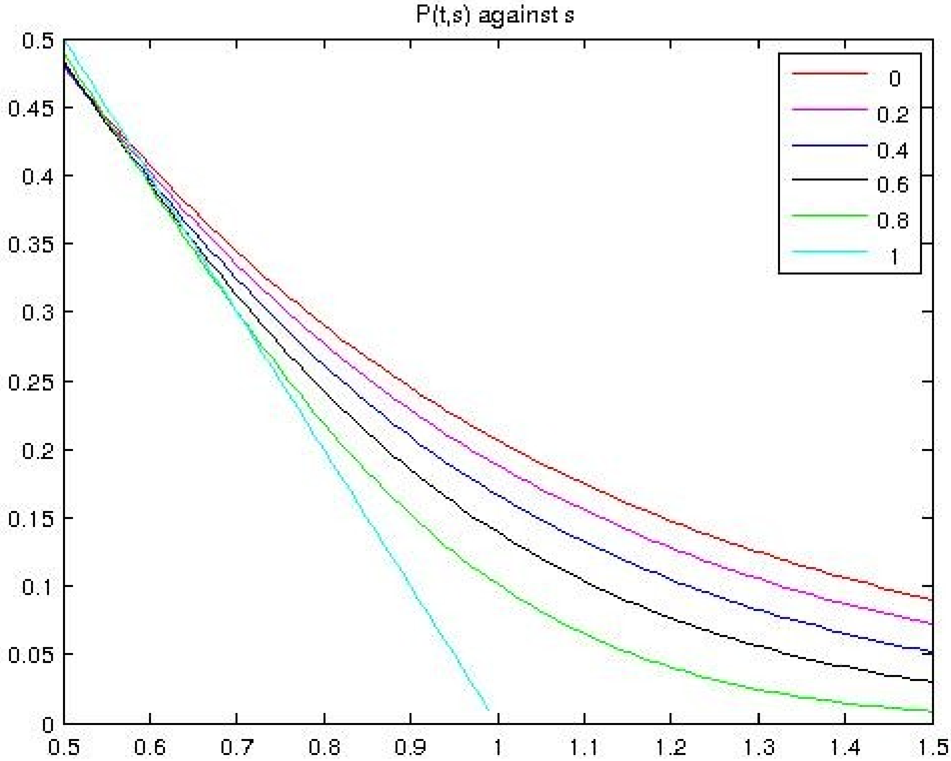
Q1)

```
function [call, put] = q1(stockprice, strikeprice, T, t, r, sg)
format short;
dp = 1/(sg*sqrt(T-t))*(log(stockprice/strikeprice)+(r+0.5*sg*sg)*(T-t));
dn = 1/(sg*sqrt(T-t))*(log(stockprice/strikeprice)+(r-0.5*sg*sg)*(T-t));
call = (stockprice*normcdf(dp))-(strikeprice*exp(-r*(T-t))*normcdf(dn));
put = (strikeprice*exp(-r*(T-t))*normcdf(-dn))-(stockprice*normcdf(-dp));
end
```

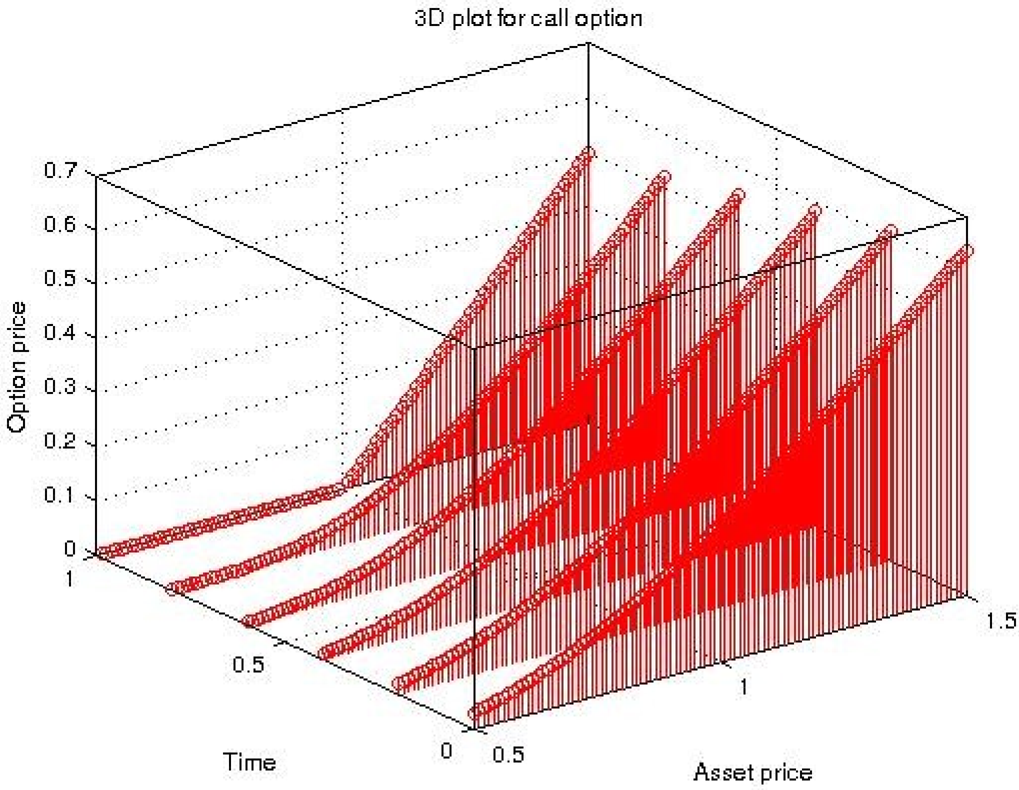
Q2)

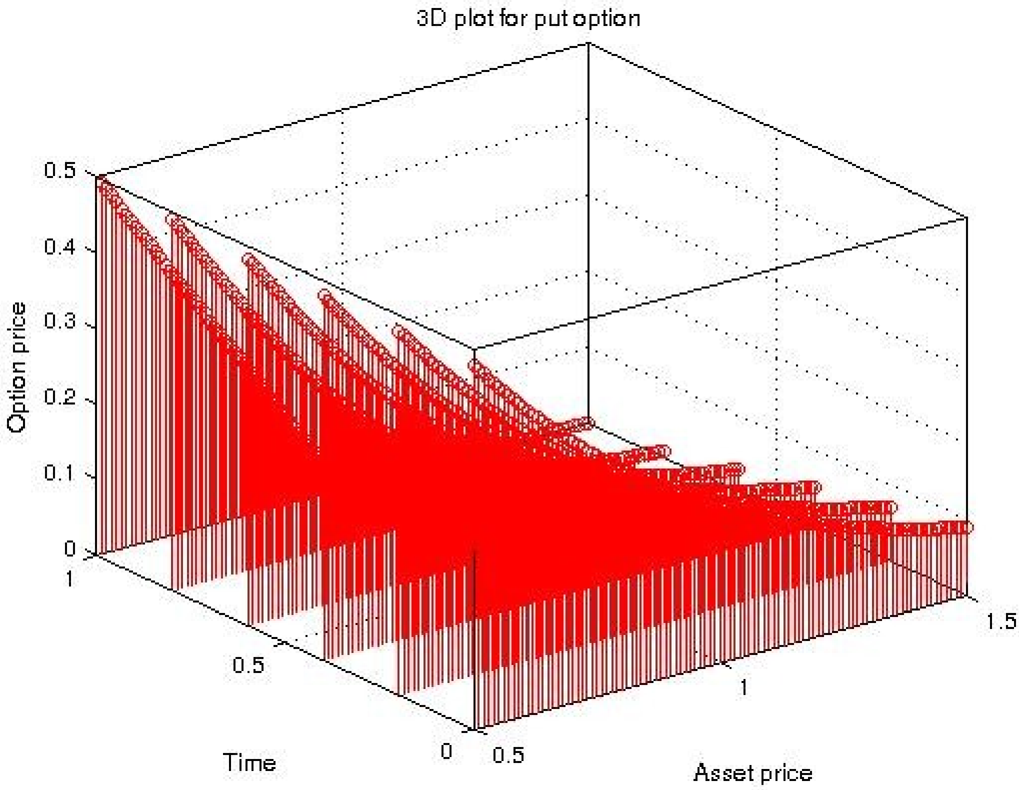
2D plots




P(t,s) against s
0
0.2
0.4
0.6
0.8
1
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.5 0.6 0.7 0.8 0.9 1 1.1 1.2 1.3 1.4 1.5

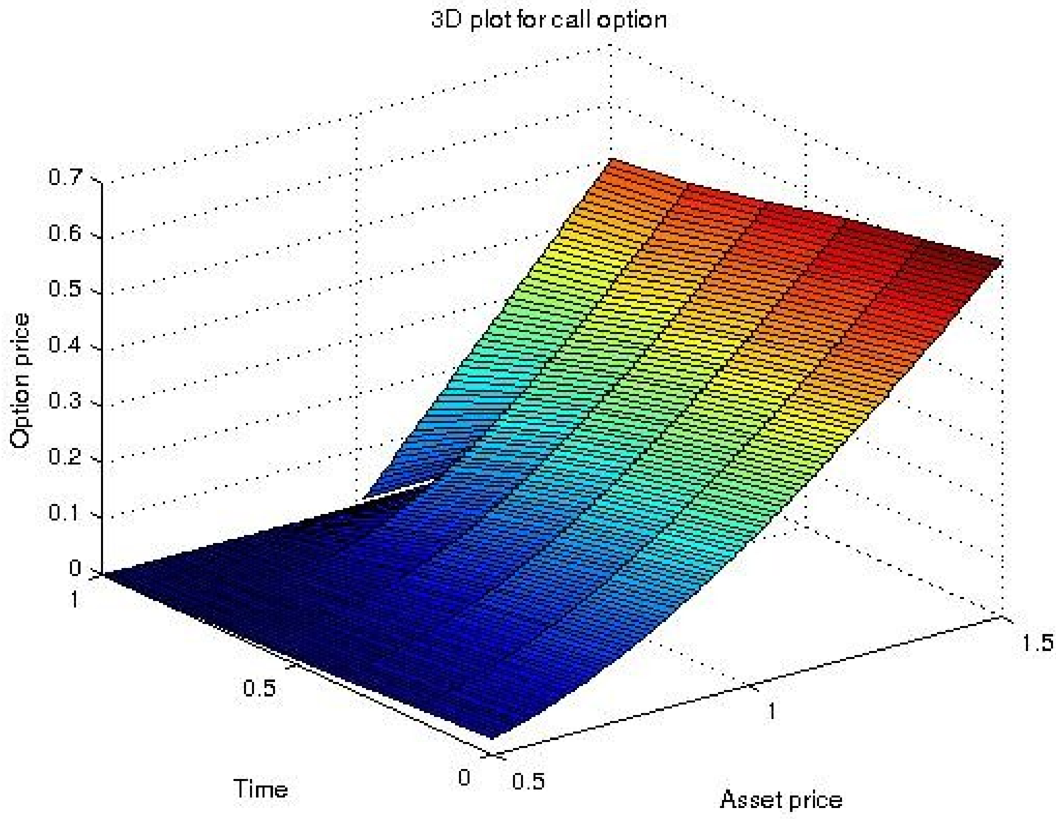
3D plots


3D plot for call option
Option price
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Time
1
0.5
0
Asset price
0.5
1
1.5

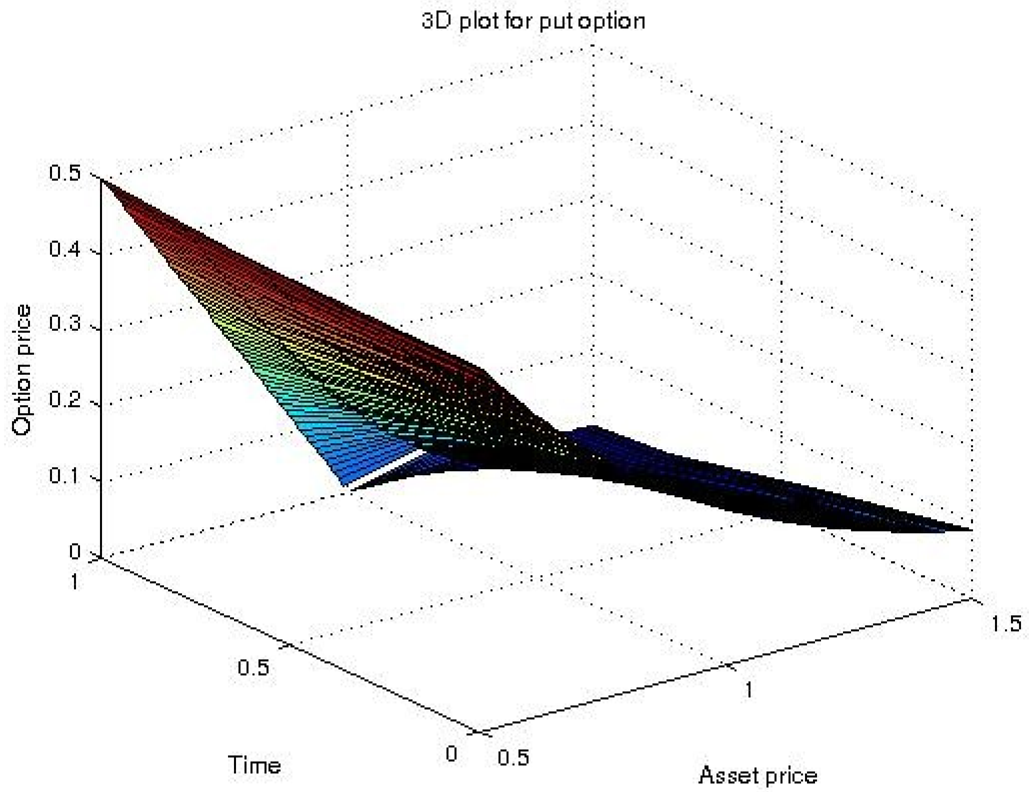

3D plot for put option
Option price
0.5
0.4
0.3
0.2
0.1
0
1
0.5
0
Time
0.5
1
1.5
Asset price

Q3)

call :


3D plot for call option
Option price
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
0.5
0
Time
0.5
1
1.5
Asset price

Put :

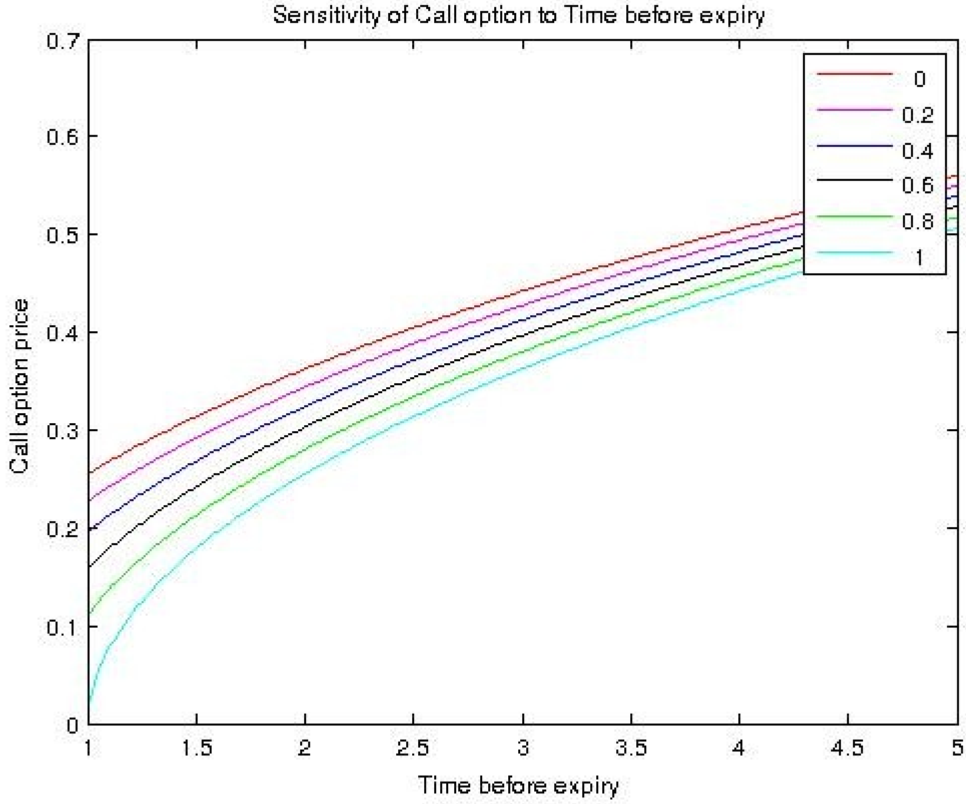


Q4)

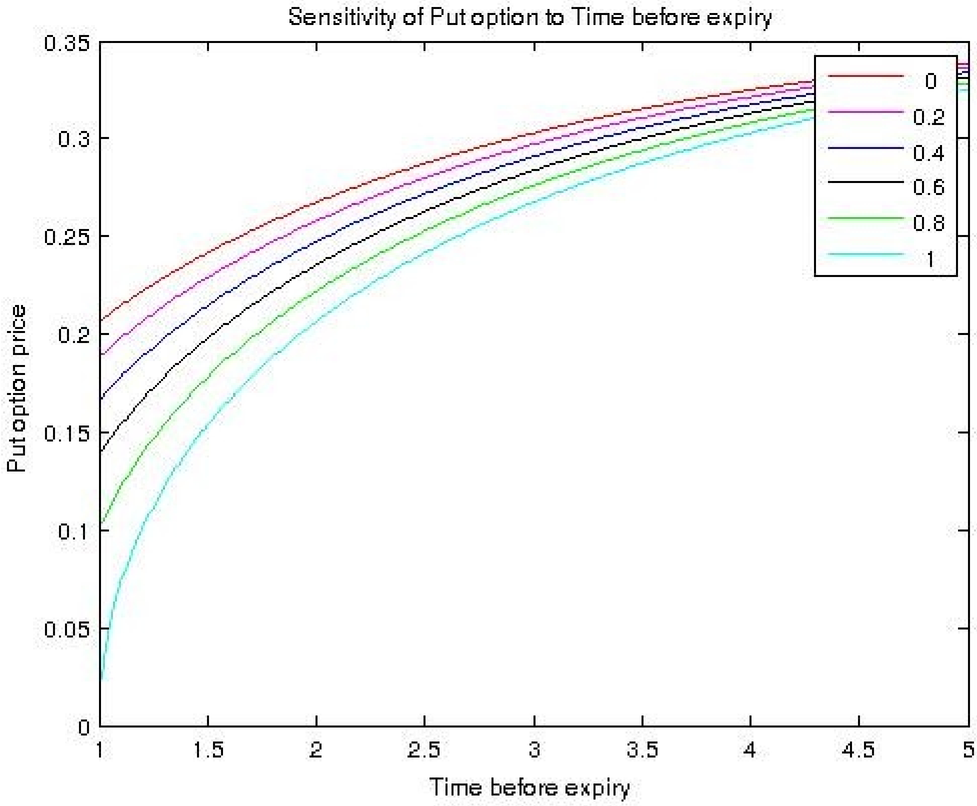
Sensitivity w.r.t T (maturity):

2D plots :

call :

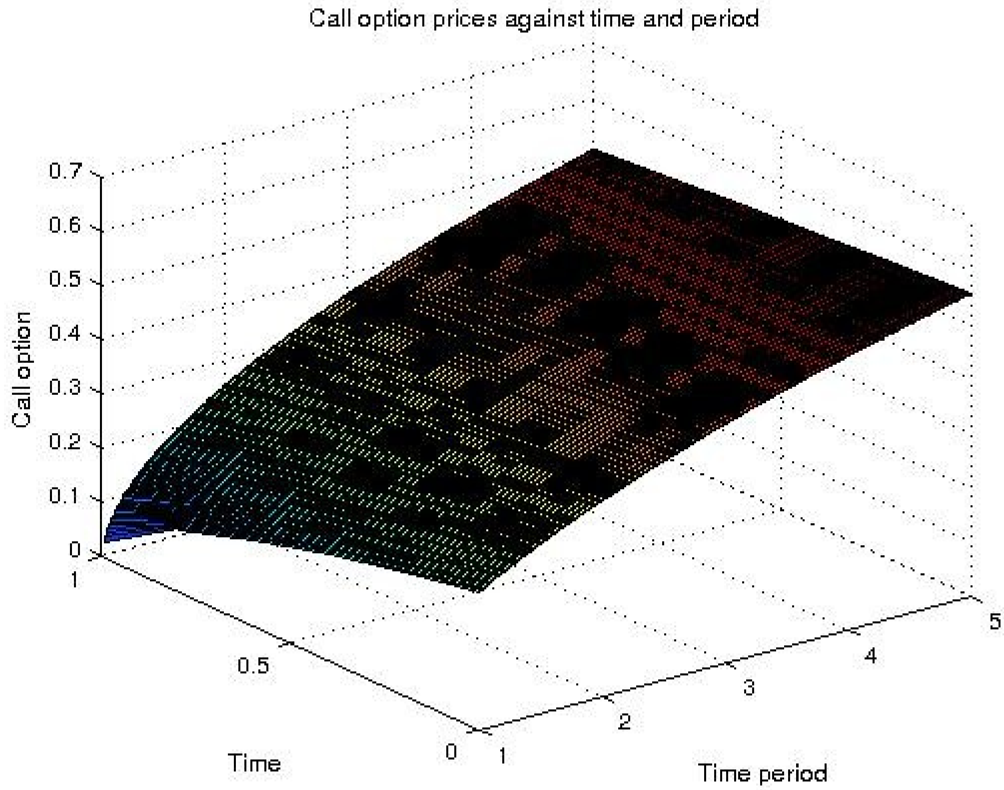

Sensitivity of Call option to Time before expiry
Call option price
Time before expiry
0
0.2
0.4
0.6
0.8
1
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
1.5
2
2.5
3
3.5
4
4.5
5

Put :

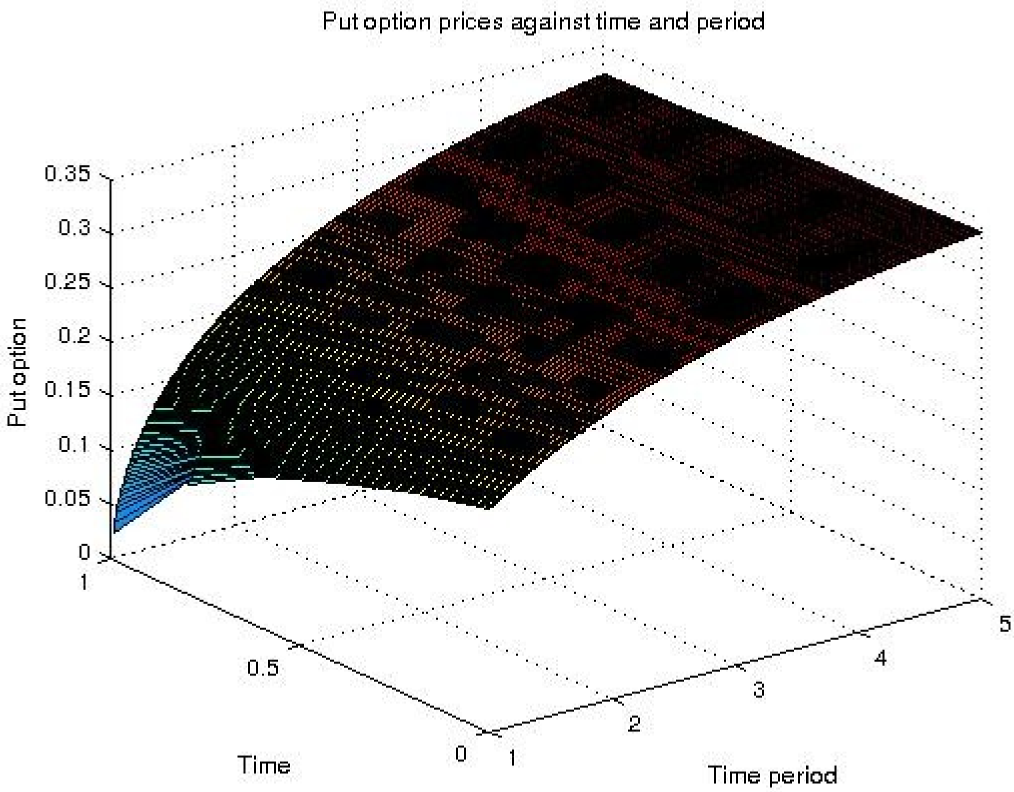

Sensitivity of Put option to Time before expiry
Put option price
Time before expiry
0
0.2
0.4
0.6
0.8
1
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1
1.5
2
2.5
3
3.5
4
4.5
5

3D plots :

call :

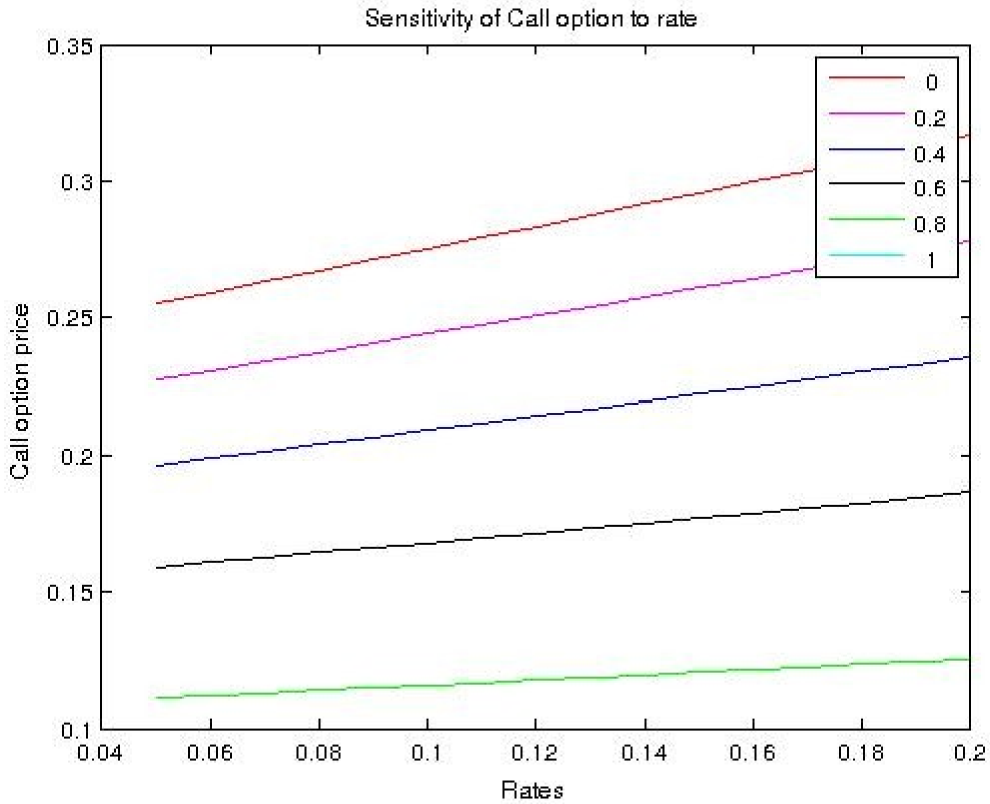


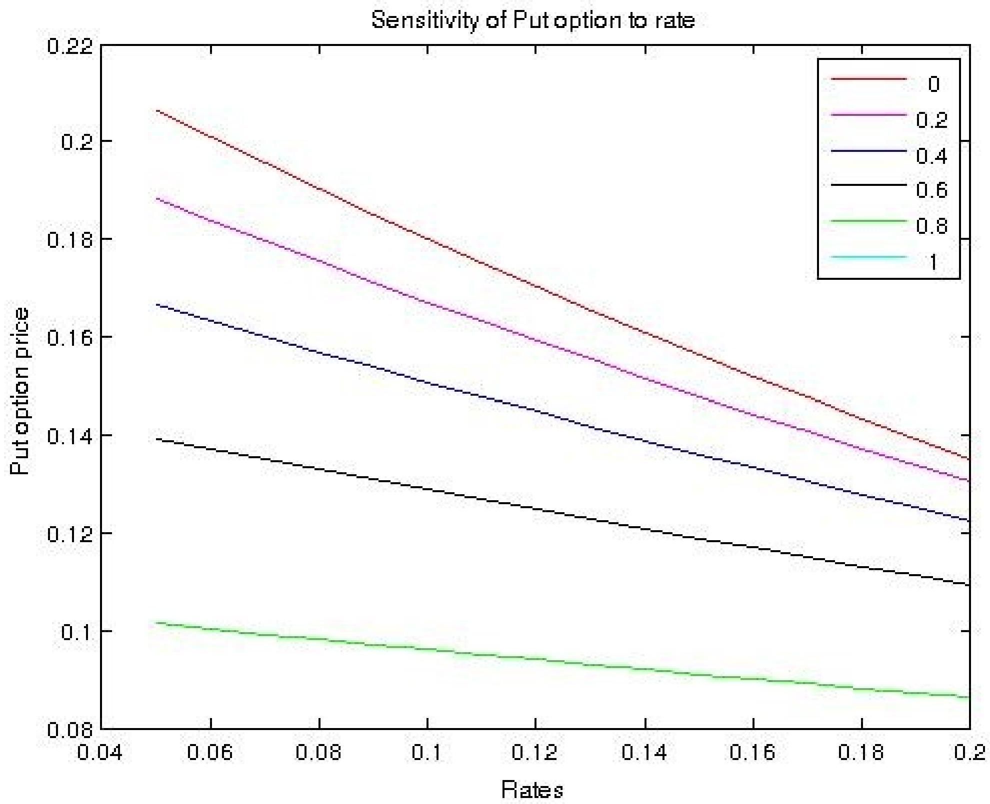
Put :



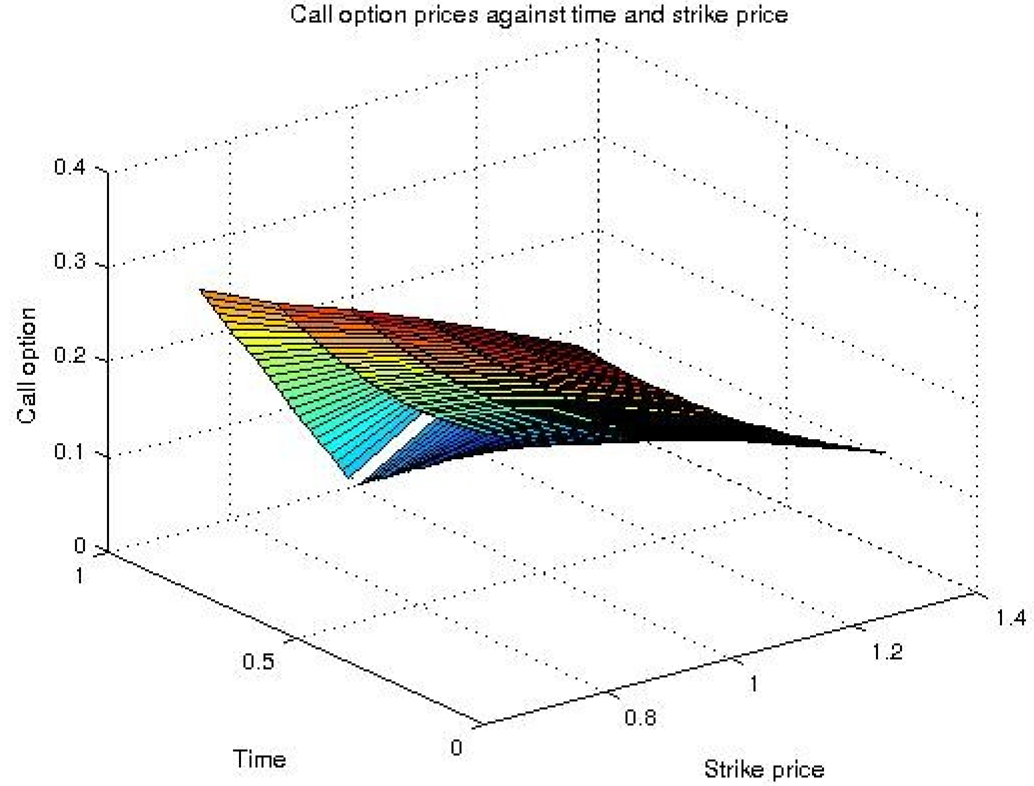
Sensitivity w.r.t r (interest rate) value :

2D plots :

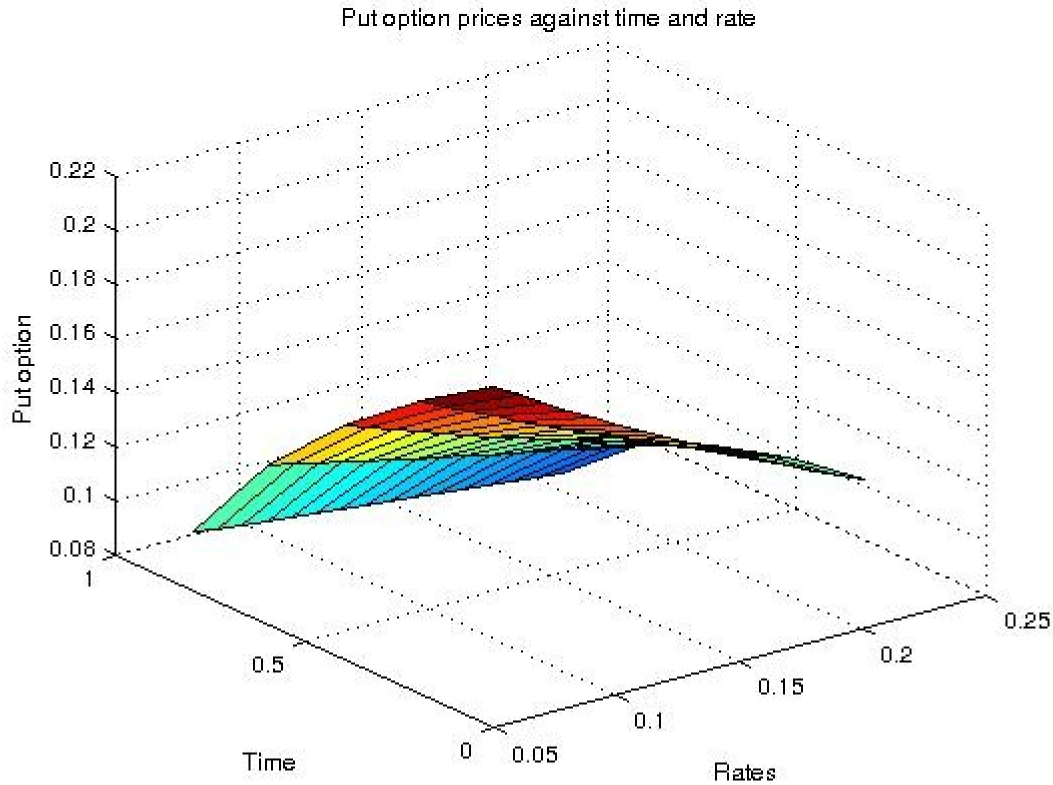




3D plots :



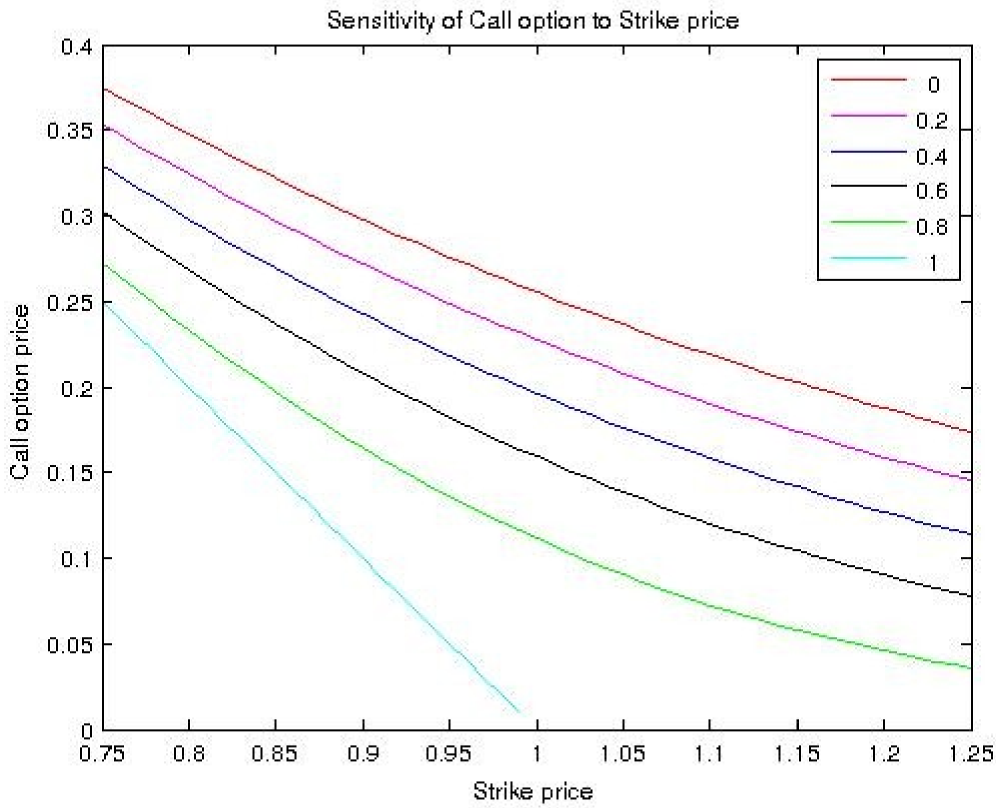
Call option prices against time and strike price
0.4
0.3
0.2
0.1
0
Call option
1
0.5
0
Time
0.8
1
1.2
1.4
Strike price

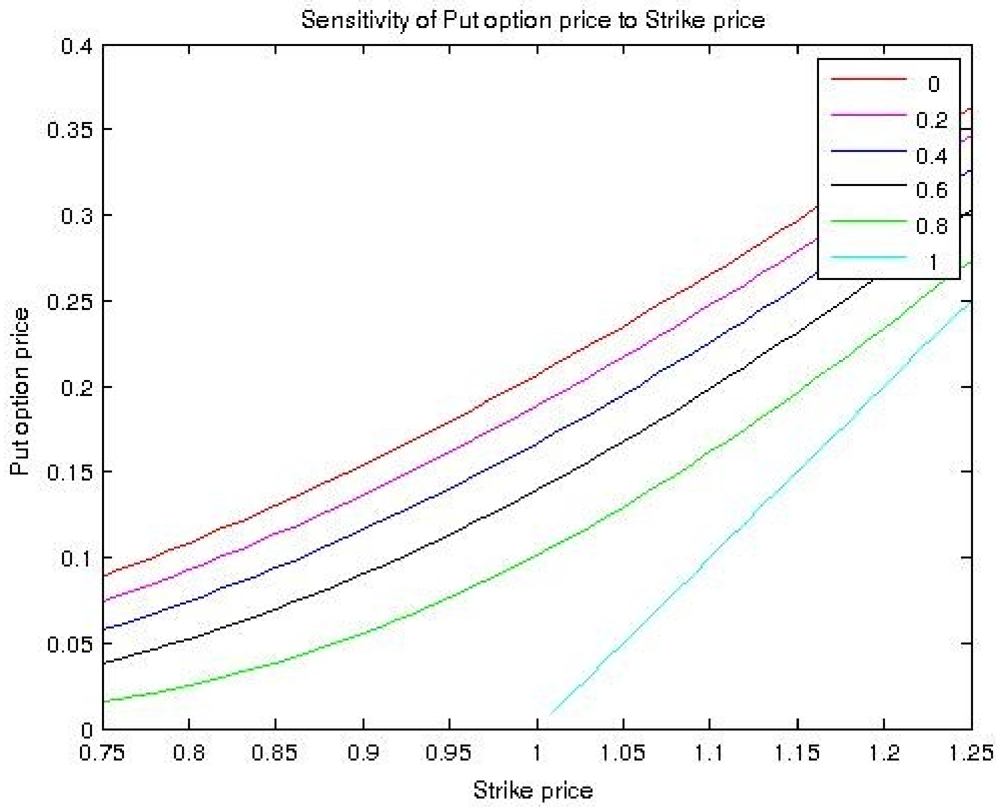


Put option prices against time and rate
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
Put option
1
0.5
0
Time
0.05
0.1
0.15
0.2
0.25
Rates

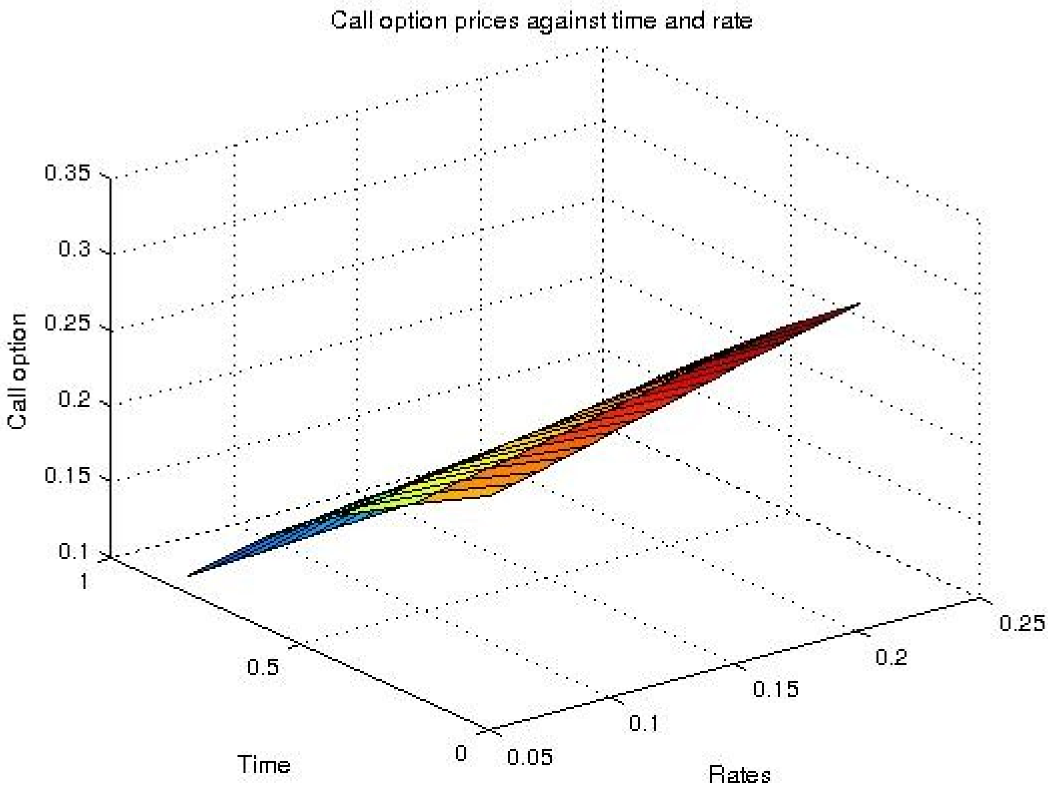
Sensitivity w.r.t Strike price K :

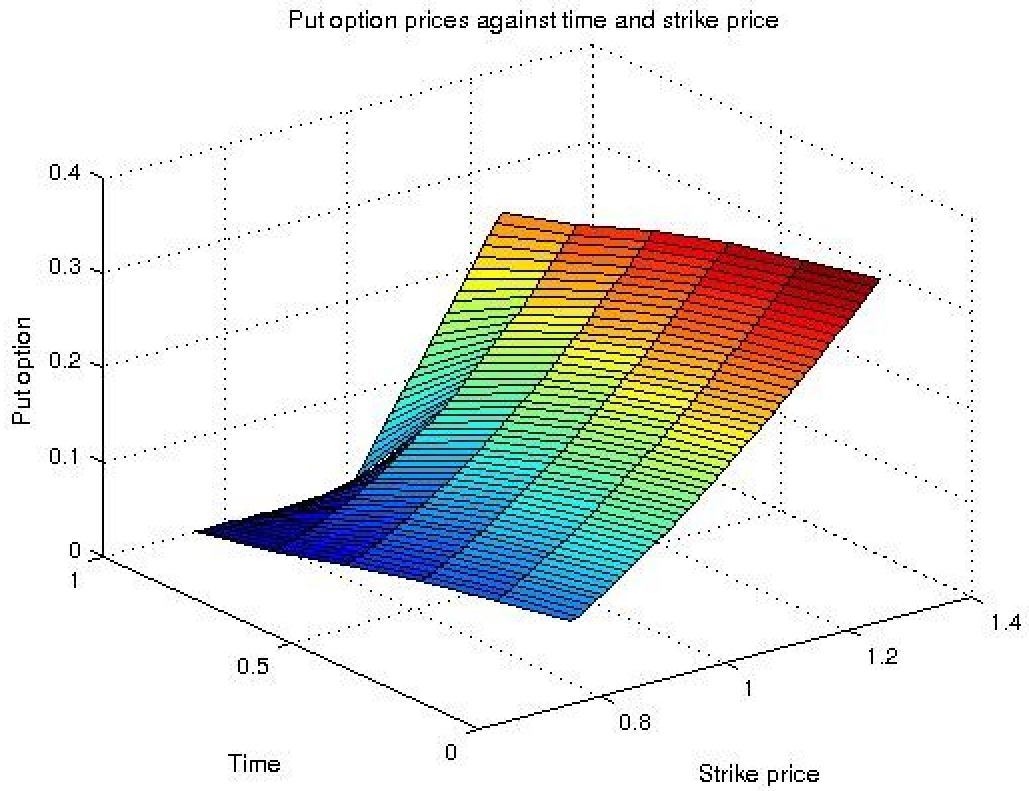
2D plots :





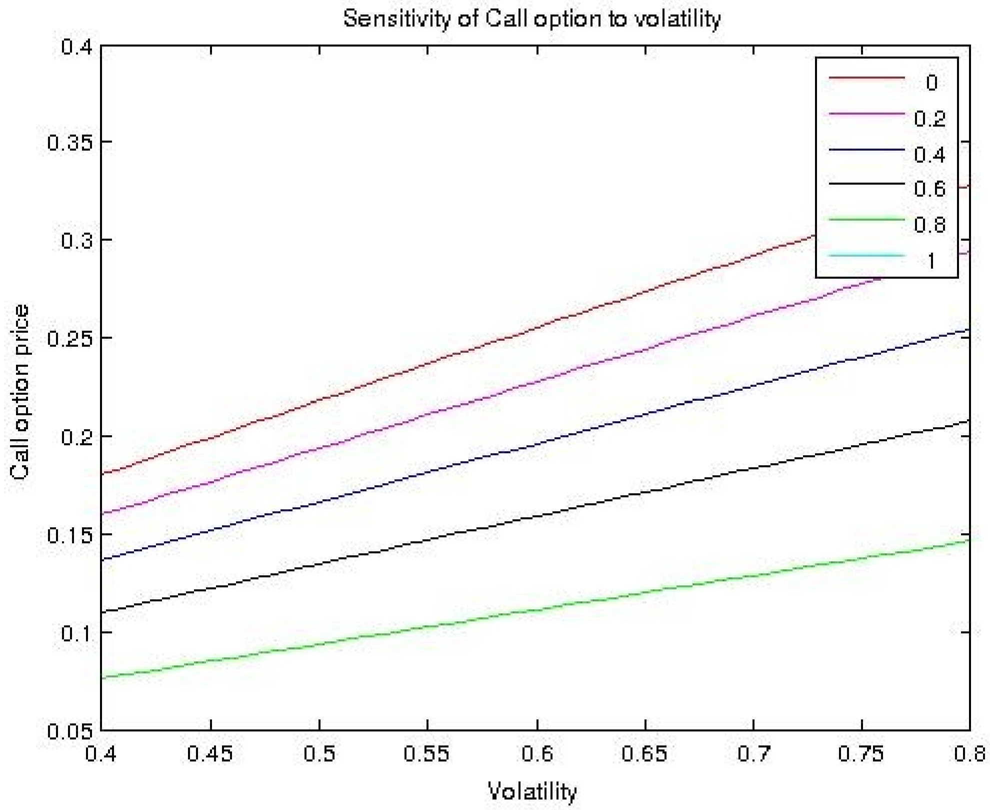
3D plots :

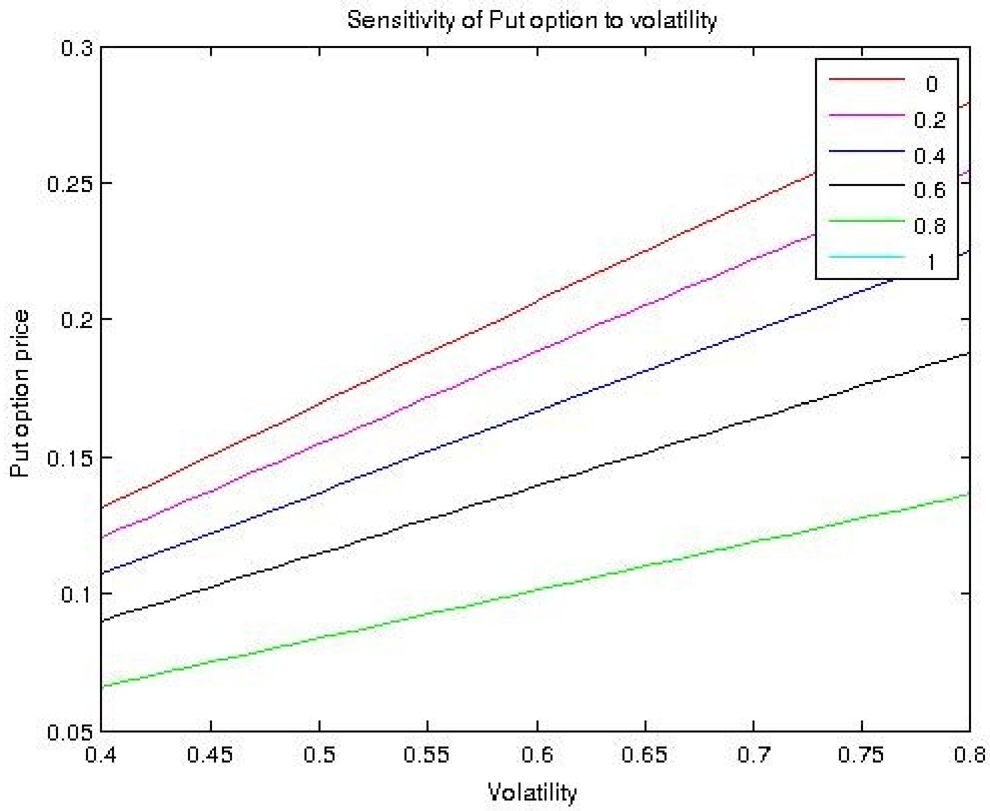

Call option prices against time and rate
Call option
0.35
0.3
0.25
0.2
0.15
0.1
1
0.5
0
Time
0.05
0.1
0.15
0.2
0.25
Rates


Put option prices against time and strike price
Put option
0.4
0.3
0.2
0.1
0
1
0.5
0
Time
0.8
1
1.2
1.4
Strike price

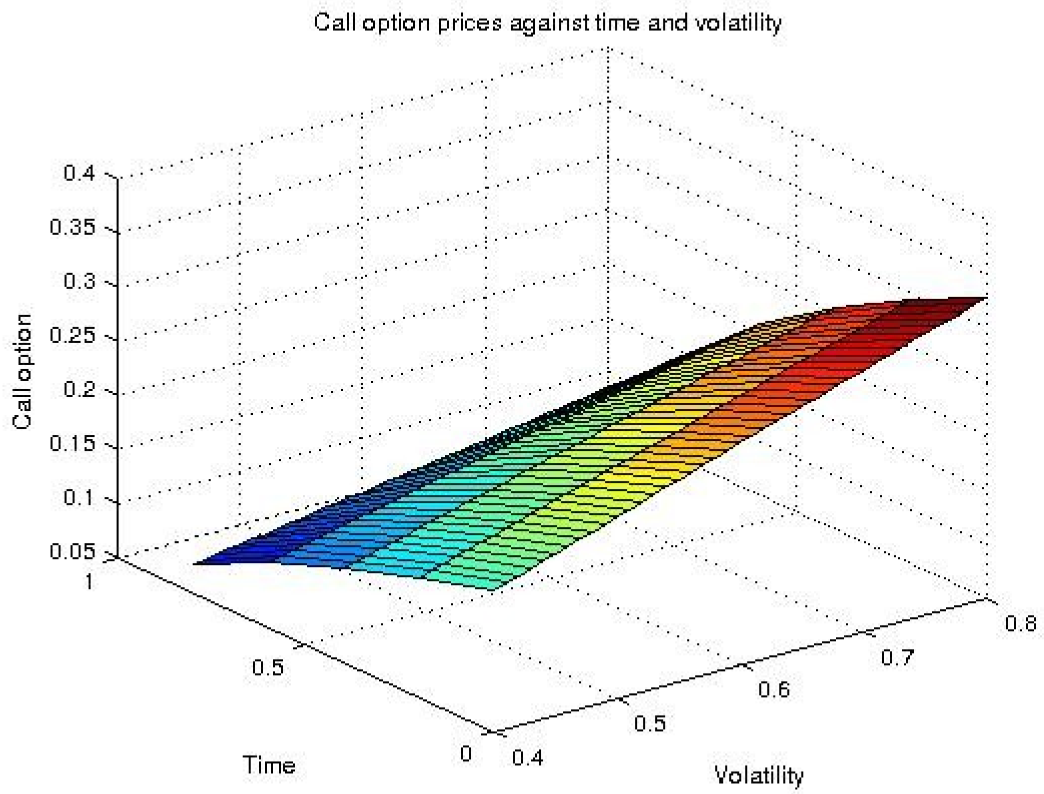
Sensitivity w.r.t sigma (volatility) :

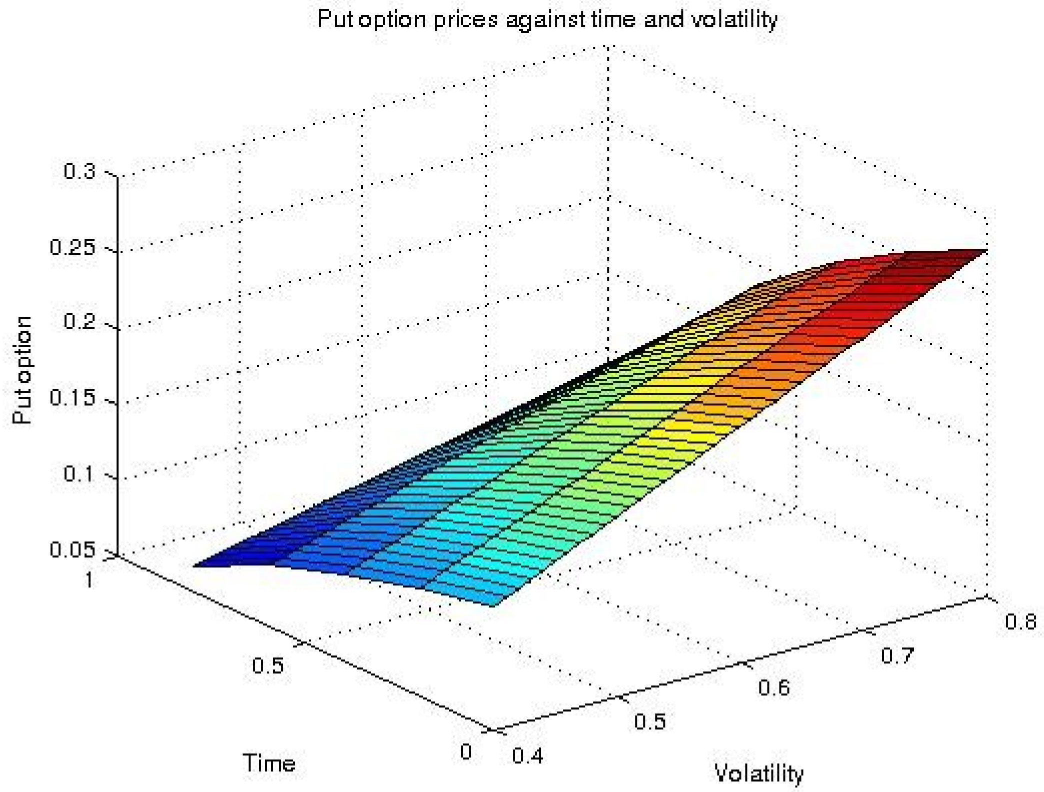
2D plots :





3D plots :


Call option prices against time and volatility
Call option
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
1
0.5
0
Time
0.4
0.5
0.6
0.7
0.8
Volatility


Put option prices against time and volatility
Put option
0.3
0.25
0.2
0.15
0.1
0.05
1
0.5
0
Time
0.4
0.5
0.6
0.7
0.8
Volatility