MF728 Homework3
Xuyang Liu
xyangliu@bu.edu

MF728 Problem Set # 3

1. Caplet Pricing in Different Models:

(a) The discount factor is about: **0.9844964370054085**

(b) Price of the option on 1Y Libor under BS model is: **0.00018393250976716114**

(c) The best σ_n is (F x σ), which is about: **0.001875**

(d) The price under normal model is about: **0.00018410496263719832**
These two prices are similar, both of them are around 0.000184. Also, the price. under normal model is higher, that's because normal model allow the negative returns while log-normal model doesn't.

(e) The results are shown below:

Strikes	Prices	Delta	Gamma	Vega	Theta
0.5%	2.280744e-14	-7.710340e-11	2.606216e-07	6.1083209e-12	-4.581240e-13
0.75%	3.024581e-08	-6.158899e-05	0.122619909	2.873904e-06	-2.155428e-07
1.0%	1.241694e-05	-0.01453869	15.446653064	0.0003620309	-2.715231e-05
1.25%	0.000183932	-0.11570475	52.220556771	0.0012239193	-9.179394e-05

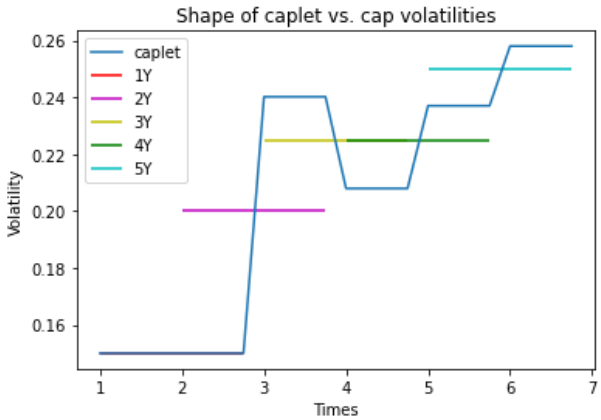
0.5% has the highest delta and theta, 1.25% has the highest gamma and vega.

2. Stripping Caplet Volatilities:

(a) Here's the result of each cap:

```
[0.0015690285168345522,
 0.00257915633347651,
 0.0033317526059298327,
 0.0036973590534893574,
 0.0044478173462264734]
```

(b) Here're the plot of caps and caplets volatilities:



From the shape we can conclude that, it seems that each cap's volatility is about the average of former and later caplets volatilities.