HW lecture 4

Sunday, October 15, 2017 1:40 PM

4.1 Forward price

```
#include<iostream>
#include<cmath>
#include<cstdio>

doublepert(doublep,doubler,doublet){
returnp*exp(r*t);
}

intmain(){
std::cout<<pert(100.5,.055,.75);
}
```

T = 0.7 => fair value Forward price =104.73

```
std::cout<<pert(95.5,(.051-.011),.65);
```

T = 0.65 => fair value Forward price = $98.02

4.2 forward arbitrage

$$F = e^{r(T-t_0)} S_0 = 100 \cdot e^{.005(1.0)} = \#105.13$$

$$105.0 < 105.13, \text{So } 105.0 = F\_$$

1. Forward price = 105.0
   F = F_ : 105.0 < 105.13
   Arbitrage strategy:
   First We sell stock today and get money,
   Then deposit the Money in bank will earn us interest rate $0.13

Finally buy back stock at time T for $105.0,
profit = B(T) - F_ = $105.13 - $105.0=$0.13

2. Forward price = 106.0 = F+
   We buy stock today for $105.0 , so we have borrow from $105.0 from bank , we owe $105.13 at the end because of interest rate.
   At time T we sell stock and get $106.0
   Finally We pay back bank 105.13
   Profit = F+ -B(T) = 106-105.13=$0.87

4.3.1 random walk 1
F0=105.5

I	Si	Fi	Money received	Money paid
1	99.5	103.3		2.2
2	101.3	104.1	.8	
3	101.3	102.1		2.00
4	100.2	101.3		.8
5	99.3	99.3		2.00

(-.8)+((2+2.2+.8+2))=6.2
99.3 + 6.2 = $105.5 paid

4.3.2 random walk 2
106.3 - 105.5=0.8
108.7-106.3=2.4
109.2-108.7=0.5
108.3-109.2=-0.9
108.3-108.3=0

((-1)*(.8+2.4+.5))+.9=-2.8
108.3-2.8=$105.5

4.3.3 summary:
No.

4.3.5 random walk 3
106.3-105.5=0.8
105.1-106.3=-1.2
Day2= (.8)-1.2=-0.4
Day3 = -.4 +.7=.3
Net profit = .8 -1.2 -0.4 +.3=- $0.5

4.3.6 random walk 4
106.3-105.5=0.8
105.1-106.3=-1.2
Day2= .8-1.2=-0.4
Day3 = -0.4+.7=0.3
Net profit = .8 -1.2 -0.4 +.3=- $0.5

4.3.7 summary:
Yes.