

MA374-Financial Engineering Laboratory

Assignment 9

Sourav Bikash
11012338

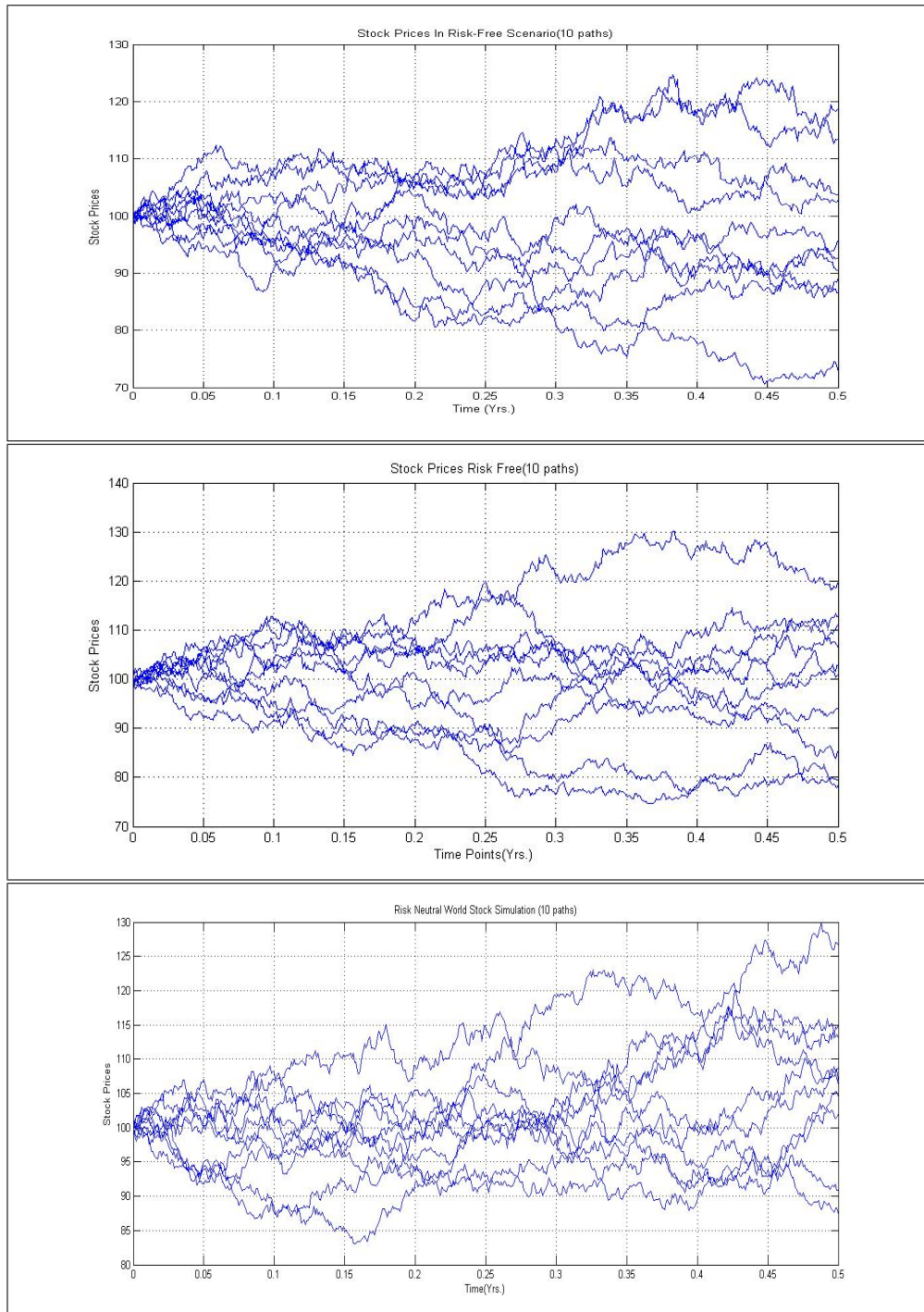
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1 Question 1

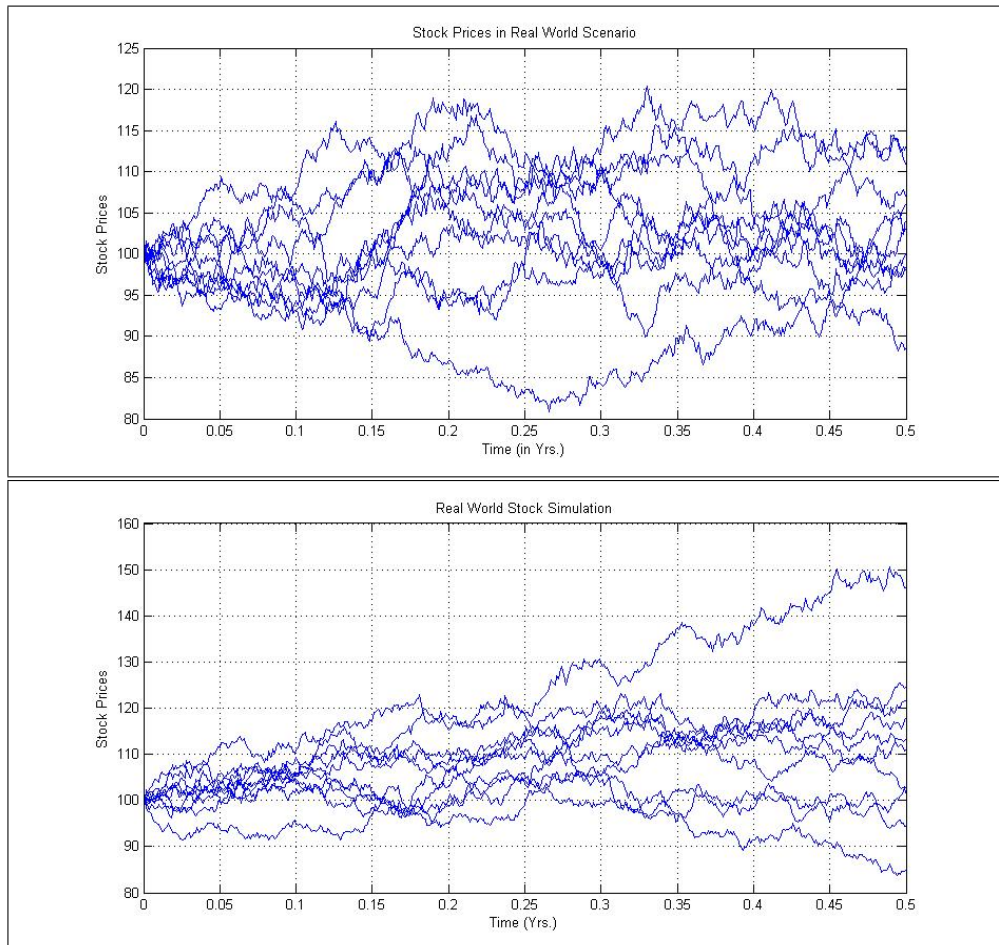
1.1 Riak Free Scenario

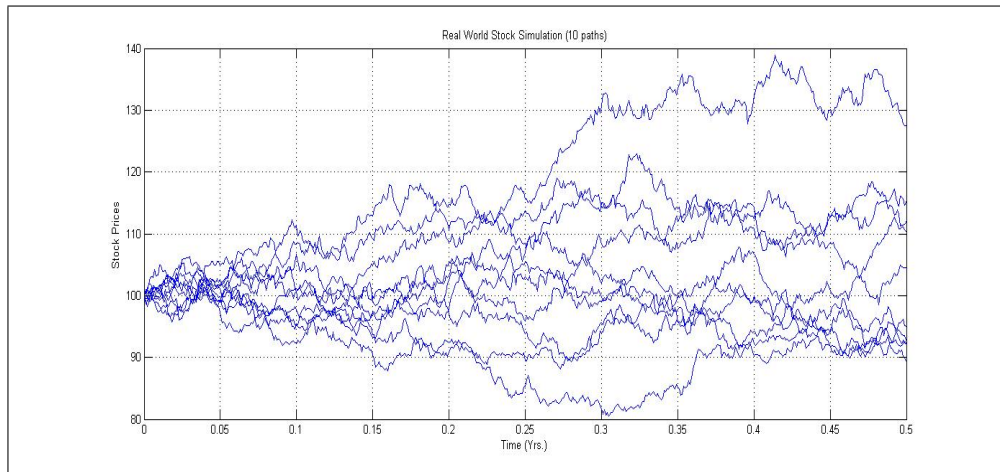


1.1.1 Option Prices

Sl.No.	Call	Put	Strike
1	10.3410	2.1576	105
2	11.9765	1.3542	110
3	0.2572	15.9833	90

1.2 Real World Scenario





1.2.1 Option Prices

Sl.No.	Call	Put	Strike
1	3.7130	1.6426	105
2	5.5330	7.2087	110
3	0.0681	12.8436	90

2 Matlab Codes

2.1 Question 1

```
%in the real world
n=10;
F1=zeros(1,n);
F2=zeros(1,n);
mu=0.1;
sigma=0.2;
j=1;
while(j<=n)
    S=100;
    U=zeros(1,501);
    R=normrnd(0,1,[1,1000]);
    U(1)=S;
    T=[0:0.001:0.5];
    i=2;
    while(i<=501)
        U(i)=U(i-1)*exp((mu-((sigma*sigma)/2))*(T(i)-T(i-1)))+(
            sigma*sqrt(T(i)-T(i-1))*(R(i-1))));
        i=i+1;
    end
    j=j+1;
end
```

```

    end
    F1(j)=U(i-1);
    F2(j)=U(i-1);
    plot(T,U);
    hold on;
    j=j+1;
end
%in the risk neutral world return=0.05;
figure;
mu=0.05;
sigma=0.2;
j=1;
F3=zeros(1,n);
F4=zeros(1,n);
while(j<=n)
    S=100;
    U1=zeros(1,501);
    R=normrnd(0,1,[1,1000]);
    U1(1)=S;
    T=[0:0.001:0.5];
    i=2;
    while(i<=501)
        U1(i)=U1(i-1)*exp((mu-((sigma*sigma)/2))*(T(i)-T(i-1))
            +(sigma*sqrt(T(i)-T(i-1))*(R(i-1)))));
        i=i+1;
    end
    F3(j)=U1(i-1);
    F4(j)=U1(i-1);
    plot(T,U1);
    hold on;
    j=j+1;
end
%call value calculation
K=105;
i=1;
while(i<=n)
    F1(i)=max((K-F1(i)),0);%call
    F2(i)=max((F2(i)-K),0);%put
    F3(i)=max((K-F3(i)),0);%call
    F4(i)=max((F4(i)-K),0);%put
    i=i+1;
end
display('call-real-value');

```

```
(mean(F1))*exp(-1*0.5*0.05)
display('put-real_value');
(mean(F2))*exp(-1*0.5*0.05)
display('call-riskfree_value');
(mean(F3))*exp(-1*0.5*0.05)
display('put-riskfree_value');
(mean(F4))*exp(-1*0.5*0.05)
```

3 References

- wikipedia...