
```
% mid-term
```

```
%Q1
```

```
n=1:10;  
p =10000;  
r = 0.0525;  
C1= p*(1+r).^n;  
C2=p*r*n;
```

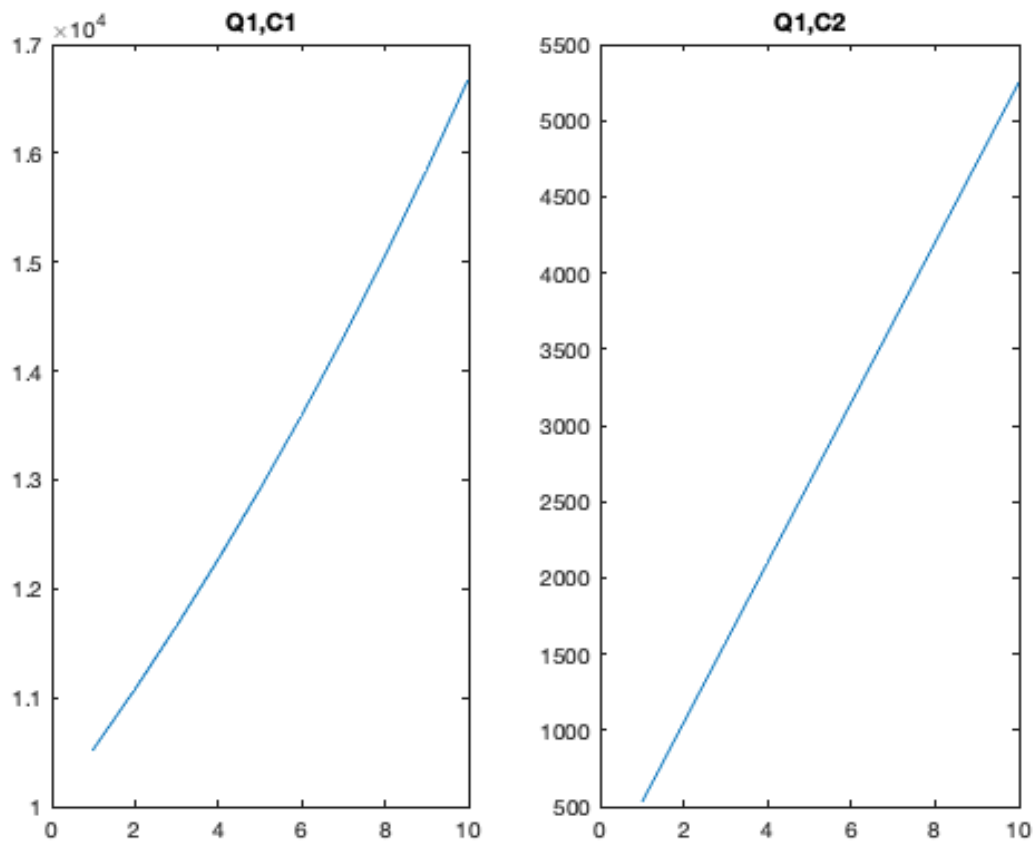
```
figure;  
subplot(1,2,1)  
plot(n, C1);  
title('Q1,C1')  
subplot(1,2,2)  
plot(n, C2);  
title('Q1,C2')
```

```
% Q2
```

```
format long  
n = 100;  
m =1:100;  
w = ones(n,1);  
u = ones(n-1,1);  
T = diag(2*m-1)+diag(u,1)+diag(u,-1);  
I = eye(n);  
Z = zeros(n);  
A = [T, I, Z; I, T, I; Z, I, T];  
s = 1:n;  
b = [s, 1./(s), s.^2]';  
x = A\b;  
x(1:5)
```

```
ans =
```

```
0.880863745977223  
0.223757721530315  
0.511806990638602  
0.461431720449604  
0.477061490606351
```



Q3

```
x = 0:5;  
y = [0.2 0.221 0.244 0.270 0.298 0.330];  
z = log(y);
```

```
A=[ones(6,1), x.'];  
rhs = log(y.');
```

```
sol = A\rhs;  
amid = sol(1); b=sol(2);
```

```
xx = 0:0.01:5;  
a = exp(amid)  
yy = a*exp(b*xx);  
[a,b]  
figure;  
plot(xx,yy, 'r-')  
hold on;  
plot(x,y, 'b.');
```

```
title('Q3')
```

```

%Q4
a =1; b =1; c=1;
[r1,r2]= quadsolver(a,b,c);
sol =[r1, r2]

a =1; b =-5; c=6;
[r1,r2]= quadsolver(a,b,c);
sol = [r1,r2]
a =1; b =-4; c=4;
[r1,r2]= quadsolver(a,b,c);
sol = [r1,r2]

function [r1,r2]= quadsolver(a,b,c)

Delta = b^2-4*a*c;
if a==0
    disp('warning: a is zero')
else

    if Delta <0
        disp('complex roots')
        r1 = (-b+sqrt(Delta))/(2*a);
        r2= (-b-sqrt(Delta))/(2*a);
    elseif Delta == 0
        disp('single root')
        r1 = (-b+sqrt(Delta))/(2*a);
        r2 = r1;
    else
        disp('two distinct roots')
        r1 = (-b+sqrt(Delta))/(2*a);
        r2 = (-b-sqrt(Delta))/(2*a);
    end
end

end
end

a =

    0.199917625414085

ans =

    0.199917625414085    0.100054929378016

complex roots

sol =

    Column 1

```

$-0.500000000000000 + 0.866025403784439i$

Column 2

$-0.500000000000000 - 0.866025403784439i$

two distinct roots

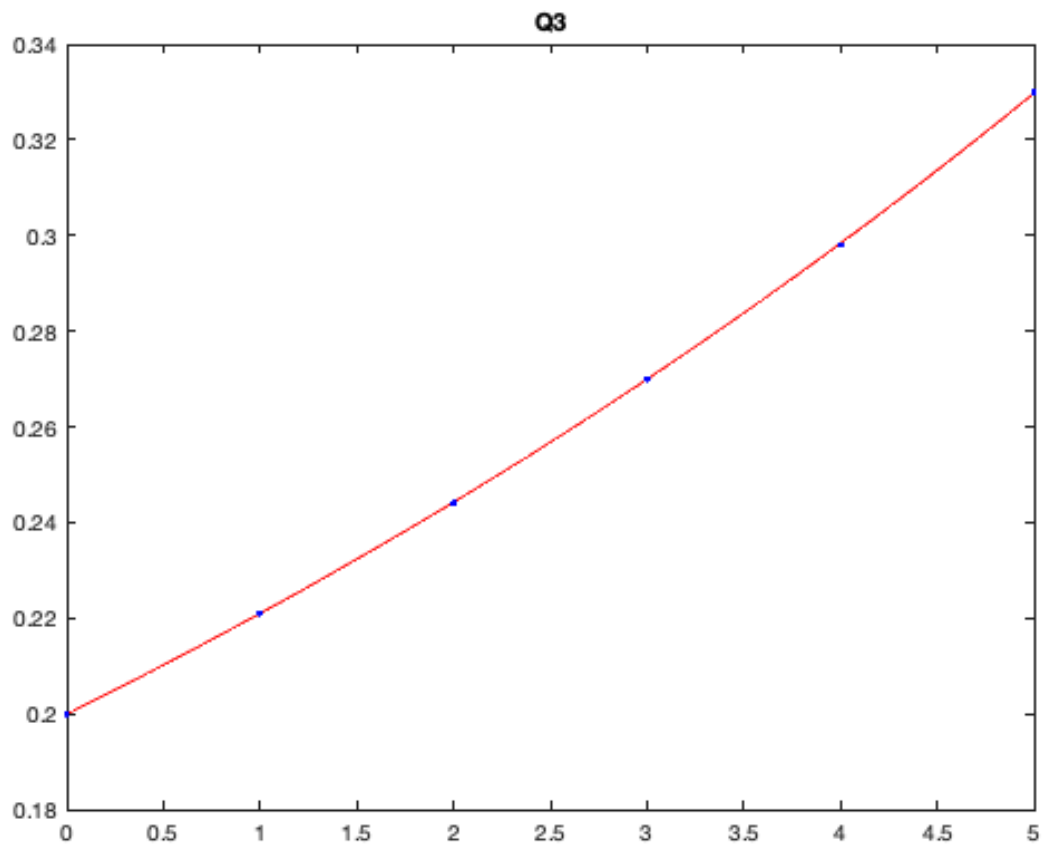
sol =

3 2

single root

sol =

2 2



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