SE 366
HOMEWORK

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Newton Rapson Method-Code

Q-1)

```
x = 0;
z = 1;
max = 10;
f = @(x) 3*x*exp(x)-1;
fder = @(x) 3*exp(x)+3*exp(x)*x;
for iteration = 1:max
z = x-(f(x)/fder(x));
error = abs(z-x);
x = z;
y = f(x);
disp('Rootvalue=')
disp(z);
disp('Error=')
disp(error);
disp('Iterationnumber=');
disp(iteration);
end
```

Results

Rootvalue=
0.3333
Error=
0.3333
Iterationnumber=
1

Rootvalue=
0.2625
Error=
0.0709
Iterationnumber=
2

Rootvalue=
0.2576
Error=
0.0048
Iterationnumber=
3

Rootvalue=
0.2576

Error=
2.0928e-05
Iterationnumber=
4

Rootvalue=
0.2576
Error=
3.9315e-10
Iterationnumber=
5

Rootvalue=
0.2576
Error=
0
Iterationnumber=
6

Rootvalue=
0.2576
Error=
0
Iterationnumber=
7

Rootvalue=
0.2576
Error=
0
Iterationnumber=
8

Rootvalue=
0.2576
Error=
0
Iterationnumber=
9

Rootvalue=
0.2576
Error=

0
Iterationnumber=
10

Secant Method

```
x=0;
f = @(x) 3*x.*exp(x)-1;

x0=0;
x1=1;
for iteration = 1:10
x2=x1-(f(x1)*(x1-x0))/(f(x1)-f(x0));
x0=x1;
x1=x2;
disp('Iterationnumber=')
disp(iteration)
disp('Rootvalue=')
disp(x2);
end
```

Results

Iterationnumber=
     1
Rootvalue=
    0.1226

Iterationnumber=
     2
Rootvalue=
    0.1888

Iterationnumber=
     3
Rootvalue=
    0.2667

Iterationnumber=
     4
Rootvalue=
    0.2571

Iterationnumber=

5
Rootvalue=
   0.2576

Iterationnumber=
   6
Rootvalue=
   0.2576

Iterationnumber=
   7
Rootvalue=
   0.2576

Iterationnumber=
   8
Rootvalue=
   0.2576

Iterationnumber=
   9
Rootvalue=
   0.2576

Iterationnumber=
   10
Rootvalue=
   NaN

Newton-Rapson Method VS Secant Method

In conclusion , Newton-Raphson Method uses line of one tangent point for evaluation,Secant Method uses a line that are two points for evaluation .Newton-Rapson Method can find the result in 3th step but Secant Method can find the solution in 5th step so that Newton-Raphson Method more efficient than Secant Method.

Least square Method
Q-2)
x = [7.38, 5.86, 2.46, 6.66, 0.83, 6.26, 6.61, 7.29, 8.91, 9.82];
y = [11.89, 2.01, 4.54, 7.26, 1.61, 3.99, 7.16, 11.17, 10.44, 1.97];
L = length(x);

for i = 1:L
k(i)=x(i)^(2/3);   %c2 coefficents

```
l(i)=x(i)*sin(x(i));      %c3 coefficents
end

A=[x.' k.' l.'];
b=A\y.';
disp(b); %in order of c1 , c2 ,c3
```

Results

c1➔ -0.1300
c2➔1.5794
c3➔1.0456