

Lab Report-04

Course Title : Numerical Analysis Lab

Course Code : CSE 224

Submitted By:

Name : Md. Mursalin Hasan Nirob

ID No : 21225103423

Intake: 49

Section: 10

Program: B.Sc. Engg. in CSE

Submitted To:

Name : Ridwan Mahbub

Lecturer

Department of: CSE

Bangladesh University of Business & Technology

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<u>Task-</u>1: Define a function for the following equation as a function file named functionDemo.m:

```
F(x) = x^3 - 23^*x^2 + 142^*x - 120
```

Solve:

```
function fx = functionDemo(x)
fx = x^3-23*x^2+142*x-120;
endfunction
```

```
Task 2: Complete the following code for bisection method:
function [root, iterations, errors] = bisection_method(guess1, guess2,
max_iterations, tolerance)
if functionDemo(guess1) * functionDemo(guess2) >= 0
error("The guess does not satisfy the required conditions");
end
iterations = 0;
errors = [];
prevGuess = 0;
while iterations < max iterations
% Insert code for bisection method
%
end
endfunction
%Example of calling the function in the command window
[root, iterations, errors] = bisection method(1
1, 20, 100, 1e-6);
```

Solve:

```
function [root,iterations,errors]
=nirob1(guess1,guess2,max_iterations,tolerance)

if functionDemo(guess1)*functionDemo(guess2) >=0
  error("The guess does not satisfy the required conditions");
  endif
  iterations = 0;
  errors = [];
  preGuess = 0;
```

```
while iterations <max_iterations
  c=(guess1+guess2)/2;
  if functionDemo(guess1)*functionDemo(guess2)<0
   guess2=c;
  else
   guess1=c;
   endif
   if iterations >1
    error = abs((c-preGuess)/c);
    preGuess = c;
    errors = [errors,error];
   else
    preGuess = c;
    endif
  iterations++;
 endwhile
  root=c;
endfunction
Comand& Output:
=> [root, iterations, errors] = nirob1(11,20,100,1e-6)
root = 11.562
```

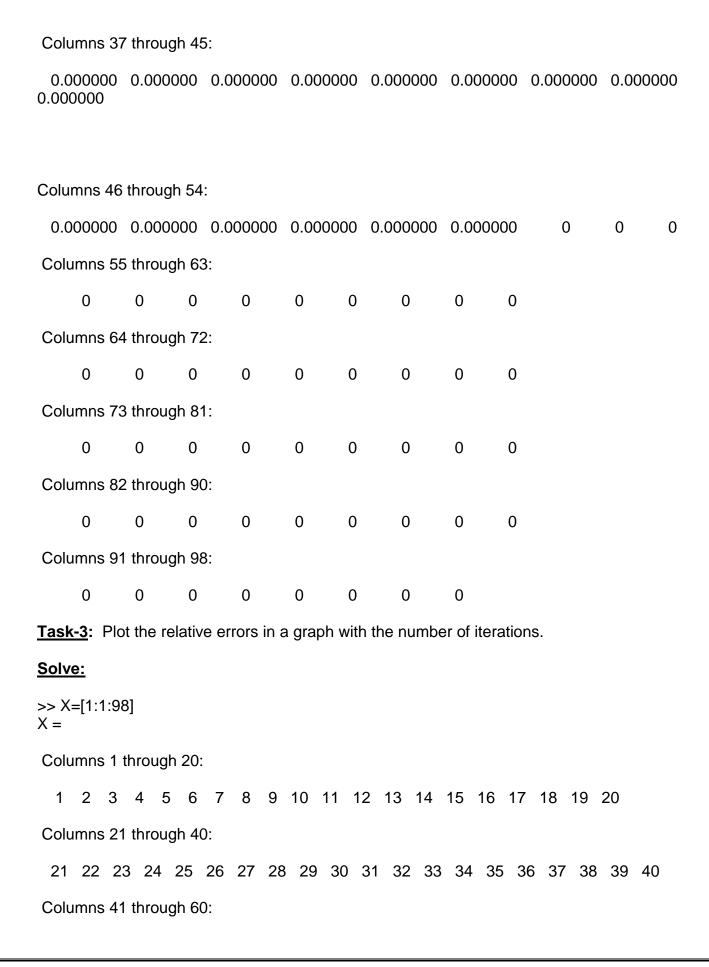
 $0.000000 \quad 0.000000 \quad 0.000000 \quad 0.000000 \quad 0.000000 \quad 0.000000 \quad 0.000000$

iterations = 100

errors =

0.000000

0.000000



41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 Columns 61 through 80:

61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 Columns 81 through 98:

81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98

>> plot(X,errors,'r:')

Graph:

