Newton's Method, Error, Newton's Fractal and Explorations

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March 3, 2024

Abstract

1 Introduction

2 Code

```
function [x,flag] = MyVectorNewton(f,Df,x0,tol,maxiter)
% Author : YourFirstName YourLastName
% Date : Today
% Purpose : Compute approximate solution to f(x )=0 via Newton's Method
%
% Inputs :
% f -- A function handle for f(x) being solved
% Df -- A function handle for the f'(x)
% x0 -- Initial guess for the fixed point
% tol -- Tolerance of the solution .
% maxiter -- Maximum number of iterations .
%
% Outputs :
% x -- Estimated solution
% flag -- Flag specifying if the solution has been obtained :
% = The number of iterations taken to converge .
% = -1 If the algorithm has not converged in maxiter iterations .
%
flag = -1;                                  %give inital value of flag and xold
x = x0;
for i = 1:maxiter             %for loop do the iteration with 'maxiter' given for the maximum
    xold = x;
    x = x - Df(x)\f(x);       %Newton
    %fprintf('%f\n',xs);
    if norm(x-xold) <= tol                %if x_new - x_old <= tol, break the loop, let flag =
        flag = i;
        break
    end                                     %if not, do next iteration
end
end

clear
```

```
clc
f = @(x)[x(2) - x(1)^3 ; x(1)^2 + x(2)^2 - 1];                          %You need to consider your c
Df = @(x)[-3* x(1)^2 , 1 ; 2*x(1) , 2* x(2)];
[xsoln , fl]= MyVectorNewton(f , Df , [ 1 ; 2 ], 10^(-12) ,10)
```

3 Summary

3.1 Results

3.2 Team Description

3.3 Future Explorations

3.4 References

Appendix