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IT/Eng04/032

Assignment 2

Electrical and Electronics

~~Engineering~~

Answer

Command Windows

clear

clc

syms x

format short g

f = exp(-0.5*x) * (4-x) - 2

Fprime = diff(f);

x = 0.5

for i = 1:10

iter(i) = i

x(i) = x;

x = double(subs(x - (f)/Fprime));

x = (i+1) * x;

Er = (i+1)^2 * abs((x(i+1)) - x(i)) / x(i+1) * 100

if Er(i) <= 1E-20

break

end

Code Table (iter; x; Er)

code + Properties - variable names [iteration number; values of x; errors]

Output

iteration number	Values of x	errors
0	0.5	0
1	0.88859	40.391
2	0.88496	5.2034
3	0.88571	0.084972
4	0.88571	2.2247×10^{-6}
5	0.88571	1.5273×10^{-12}
6	0.88571	6

$$f(x) = x^2 - 0.7x + 0.1$$

$$f'(x) = 2x - 0.7$$

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

$$x_{n+1} = x_n - \frac{x_n^2 - 0.7x_n + 0.1}{2x_n - 0.7}$$

Iteration 0: $x_0 = 0.5$

Iteration 1: $x_1 = 0.88859$

Iteration 2: $x_2 = 0.88496$

Iteration 3: $x_3 = 0.88571$

Iteration 4: $x_4 = 0.88571$

Iteration 5: $x_5 = 0.88571$

Iteration 6: $x_6 = 0.88571$