Fixed Point Iteration Algorithm

Write the program in the editor page by clicking on **New Script** , **Save** it , then click **Run.**

Example1:

Consider the function g (x) = $(x^2+3)/(2x-1)$= x. Approximate a root of using a fixed-point method, by taking x_0=2.5.

Solution:

g=inline('(x^2+3)/(2*x-1)');

x0=input('x0=');

n=input('n=');

for i=1:n

 x1=g(x0);

 disp(x0)

 if abs(x1-x0)<0.001

 break

 else

 x0=x1;

 end

end

Answer:

x0=2.5

n=5

2.5000

2.3125

2.3028

Example2;

Use a fixed-point iteration method to determine a solution accurate to within 10^{-2} for $x^4 - 3x^2 - 3 = 0$ on [1, 2]. Use $p_0 = 1$.

Solution: Invert the problem into fixed point problem, then

g=inline('(3*x^2+3)^0.25');

x0=input('x0=');

n=input('n=');

for i=1:n

 x1=g(x0);

 disp(x0)

 if abs(x1-x0)<0.01

 break

 else

 x0=x1;

 end

end

Answer:

x0=1

n=9

  1

  1.5651

  1.7936

  1.8859

  1.9228

  1.9375

Exercise; Do exercises and examples in Lecture3 using MATLAB