

MATLAB EXPERIMENT 1B

Maxima and Minima of a function of one variable



February 12, 2021

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MAT 1011 – Calculus for Engineers (MATLAB)

Experiment 1-B

Maxima and Minima of a function of one variable

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**Question 1:**

**Find the local and global maxima and minima for the function on x∈(−4,4).**

**Code:**

clear

clc

close all

syms x

%the given function and interval

f(x)= x^3-12\*x-5;

I=[-4,4];

f1(x)=-f(x);

%End values of the interval

a=I(1);b=I(2);

t=linspace(a,b,100); %create 100 points in between a and b (in the interval)

g=double(f(t)); %Finding the values of f(x) at t values

[lmax\_f,loc]=findpeaks(g);

lmax\_x=round(t(loc),4);

h=double(f1(t));

[lmin\_f,loc]=findpeaks(h);

lmin\_x=round(t(loc),4);

disp('Local maximum occur at x=')

disp(lmax\_x)

disp('The Local Maximum value(s) of the function are ')

disp(double(f(lmax\_x)))

disp('Local minimum occur at x=')

disp(lmin\_x)

disp('The Local Minimum value(s) of the function are ')

disp(double(f(lmin\_x)))

%Plotting the function

plot(t,f(t));

hold on;

%Pointing the local maxima on the curve of f(x)

plot(lmax\_x,double(f(lmax\_x)),'or');

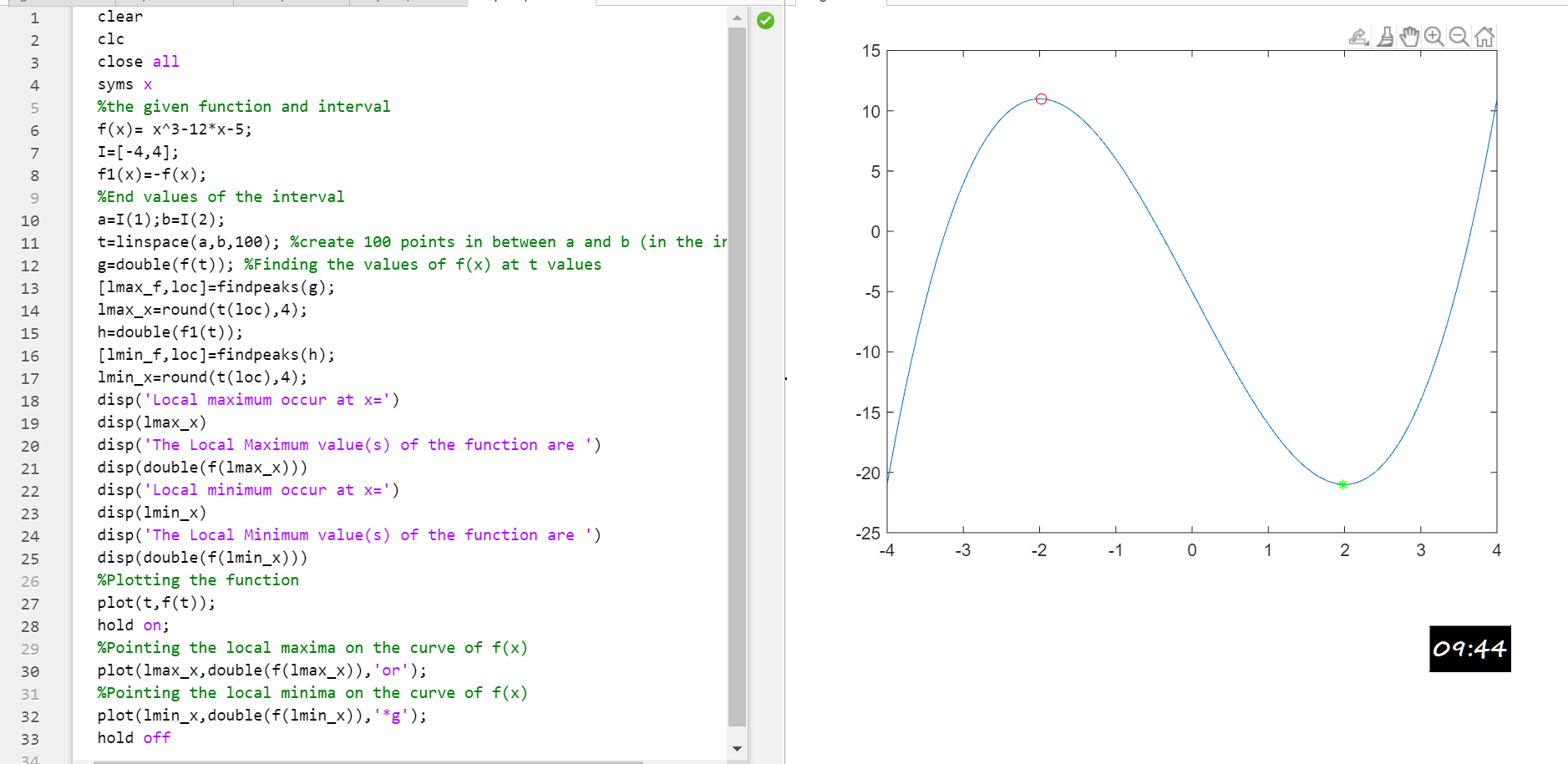
%Pointing the local minima on the curve of f(x)

plot(lmin\_x,double(f(lmin\_x)),'\*g');

hold off

**OUTPUT:**

Local maximum occur at x=  
 -1.9798  
  
The Local Maximum value(s) of the function are   
 10.9976  
  
Local minimum occur at x=  
 1.9798  
  
The Local Minimum value(s) of the function are   
 -20.9976

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**QUESTION 2:**

**Find the local and global maxima and minima for the function x +sin 2x on x∈(−5,5).**

**CODE:**

clear

clc

close all

syms x

%the given function and interval

f(x)= x+ sin(2\*x);

I=[-5,5];

f1(x)=-f(x);

%End values of the interval

a=I(1);b=I(2);

t=linspace(a,b,100); %create 100 points in between a and b (in the interval)

g=double(f(t)); %Finding the values of f(x) at t values

[lmax\_f,loc]=findpeaks(g);

lmax\_x=round(t(loc),4);

h=double(f1(t));

[lmin\_f,loc]=findpeaks(h);

lmin\_x=round(t(loc),4);

disp('Local maximum occur at x=')

disp(lmax\_x)

disp('The Local Maximum value(s) of the function are ')

disp(double(f(lmax\_x)))

disp('Local minimum occur at x=')

disp(lmin\_x)

disp('The Local Minimum value(s) of the function are ')

disp(double(f(lmin\_x)))

%Plotting the function

plot(t,f(t));

hold on;

%Pointing the local maxima on the curve of f(x)

plot(lmax\_x,double(f(lmax\_x)),'or');

%Pointing the local minima on the curve of f(x)

plot(lmin\_x,double(f(lmin\_x)),'\*g');

hold off

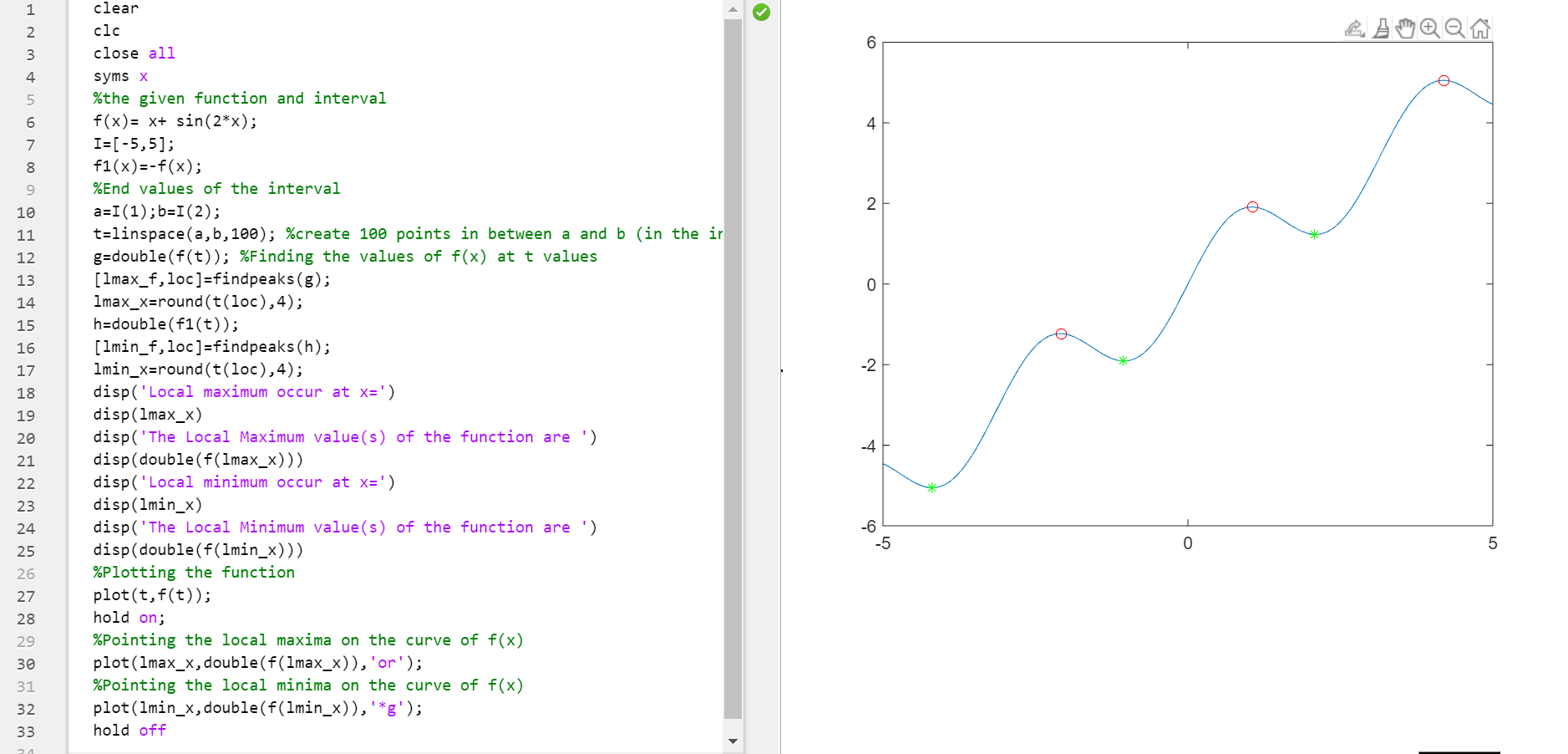
**OUTPUT:**

Local maximum occur at x=  
 Column 1  
 -2.0707  
 Column 2  
 1.0606  
 Column 3  
 4.1919

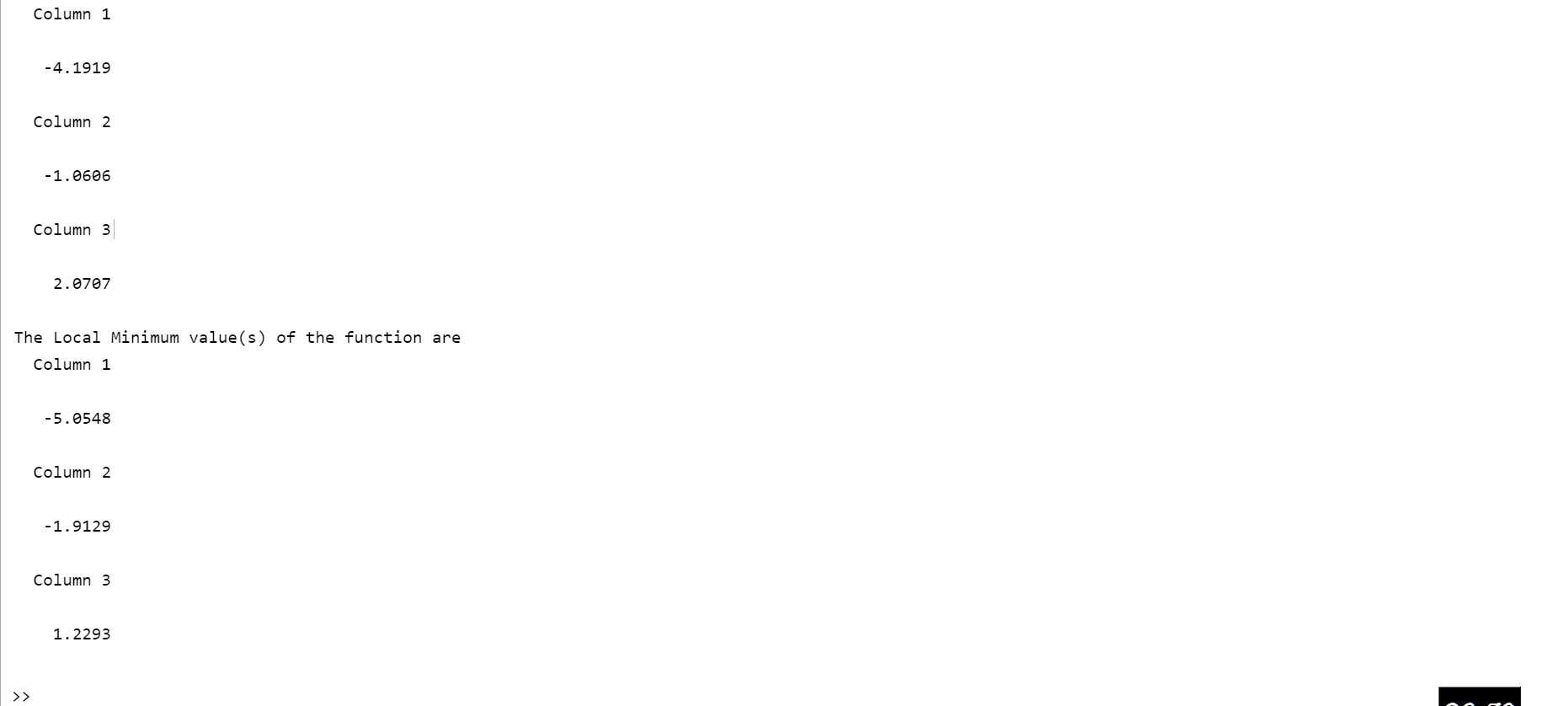
The Local Maximum value(s) of the function are   
 Column 1  
 -1.2293  
 Column 2  
 1.9129  
 Column 3  
 5.0548

Local minimum occur at x=  
 Column 1  
 -4.1919  
 Column 2  
 -1.0606  
 Column 3  
 2.0707

The Local Minimum value(s) of the function are   
 Column   
 -5.0548  
 Column 2  
 -1.9129  
 Column 3  
 1.2293







\*--THE END--\*

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