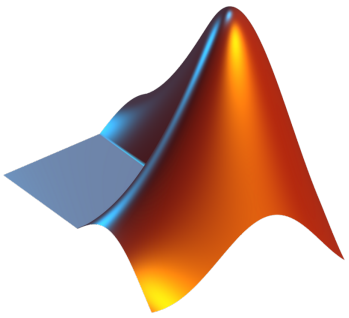
جامعة المستقبل
AL MUSTAQBAL UNIVERSITY
كلية العلوم



1st class

2024- 2025

Mathematics

Practical

MATLAB

Lecture 4

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الرياضيات الاساسية: المرحلة الاولى

مادة الرياضيات

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المحاضرة الرابعة

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Contents

1 Loops

Loops allow you to repeat a block of code multiple times.

1.1 The for Loop

A for loop is used to iterate over a range of values.

```
for i = 1:5
    disp(['Iteration: ', num2str(i)]);
end
% Output.
% Iteration: 1
% Iteration: 2
% Iteration: 3
% Iteration: 4
% Iteration: 5
```

1.2 The while Loop

A while loop continues to execute as long as a specified condition is true.

```
x = 1;
while x <= 5
    disp(['x: ', num2str(x)]);
    x = x + 1; % Increment x
end
% Output.
% x: 1
% x: 2
% x: 3
% x: 4
```

```
% x: 5
```

2 Break and Continue Statements

2.1 break Statement

Terminates the loop immediately.

```
for i = 1:10
    if i == 5
        break; % Exit the loop when i is 5
    end
```

2.2 continue Statement

Skips the rest of the loop iteration and proceeds to the next iteration.

```
for i = 1:10
    if mod(i, 2) == 0
        continue; % Skip even numbers
    end
    disp(['Odd i: ', num2str(i)]);
end
% Output.
% Odd i: 1
% Odd i: 3
% Odd i: 5
% Odd i: 7
% Odd i: 9
```

3 Plotting and Visualization

In MATLAB, plotting and visualization are essential tools for analyzing data and presenting results. MATLAB provides a wide range of functions to create different types of plots, graphs, and visualizations.

3.1 Basic Plotting

3.1.1 Simple 2D Line Plot

The plot function is used to create 2D line plots.

```
x = 0:0.1:2*pi; % Generate x values from 0 to 2
y = sin(x); % Compute the sine of each x value

plot(x, y) % Create the plot
xlabel('x'); % Label for x-axis
ylabel('sin(x)'); % Label for y-axis
title('Plot of sin(x)'); % Title of the plot
```

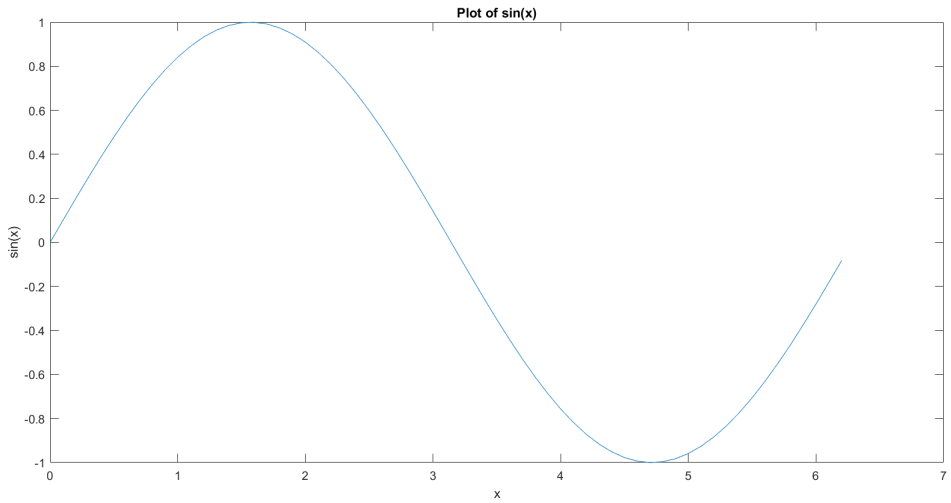

Figure 1: Plot of sin(x) and cos(x)

3.1.2 Multiple Lines on the Same Plot

You can plot multiple lines on the same graph by passing multiple sets of data to plot.

```
x = 0:0.1:2*pi;
y1 = sin(x);
y2 = cos(x);

plot(x, y1, '-r', x, y2, '--b'); % Plot both sin(x) and cos(x)
xlabel('x');
ylabel('y');
legend('sin(x)', 'cos(x)'); % Add a legend
title('Plot of sin(x) and cos(x)');
```

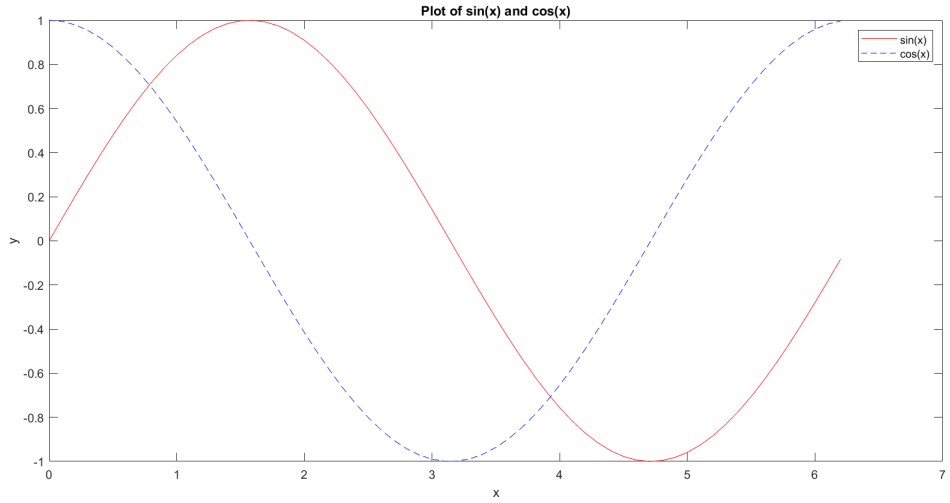

Figure 2: Plot of sin(x) and cos(x)

3.1.3 Subplots

The subplot function allows you to display multiple plots in the same figure.

```
x = 0:0.1:2*pi;
y1 = sin(x);
```

```
y2 = cos(x);

subplot(2,1,1); % 2 rows, 1 column, first subplot
plot(x, y1);
title('sin(x)');

subplot(2,1,2); % 2 rows, 1 column, second subplot
plot(x, y2);
title('cos(x)');
```

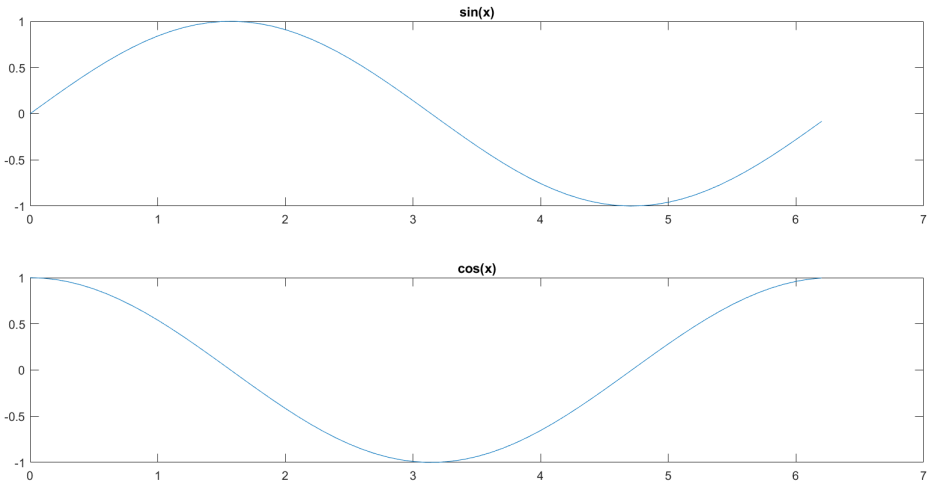

Figure 3: subplot: sin(x) and cos(x)