**MATLAB Functions**

**Created by MathWorks for**
**Structural Dynamics**

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$$a = \sqrt{4}$$

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a = sqrt(4)
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We have used functions available in MATLAB before like sqrt to find the square root of a number.

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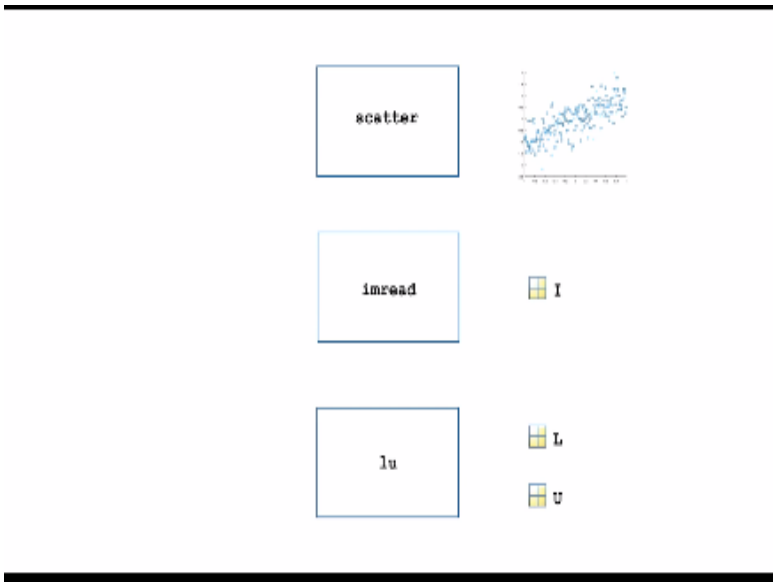


But there are also functions to visualize data import an image or even perform a matrix LU decomposition.

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There are thousands of MATLAB functions that help us with a wide variety of tasks. But if we are going to leverage all that functionality how do we use a general MATLAB function.

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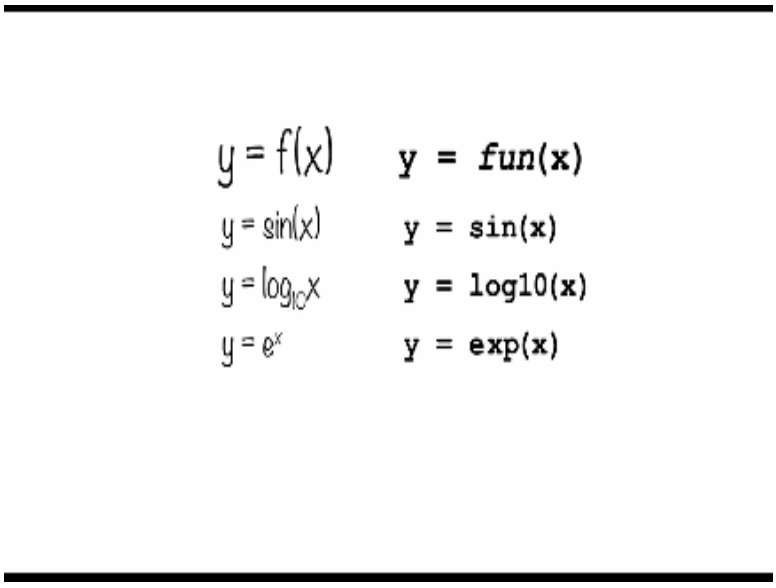


The standard syntax for any MATLAB function is like that of a mathematical function. We have the function name the argument enclosed in parentheses and we can assign the result to an output variable. There can even be lots of inputs and lots of outputs depending on the function. Let us start with the basics, many familiar mathematical functions like sin, logarithm or the exponential follow this same pattern and take on similar names as MATLAB functions.

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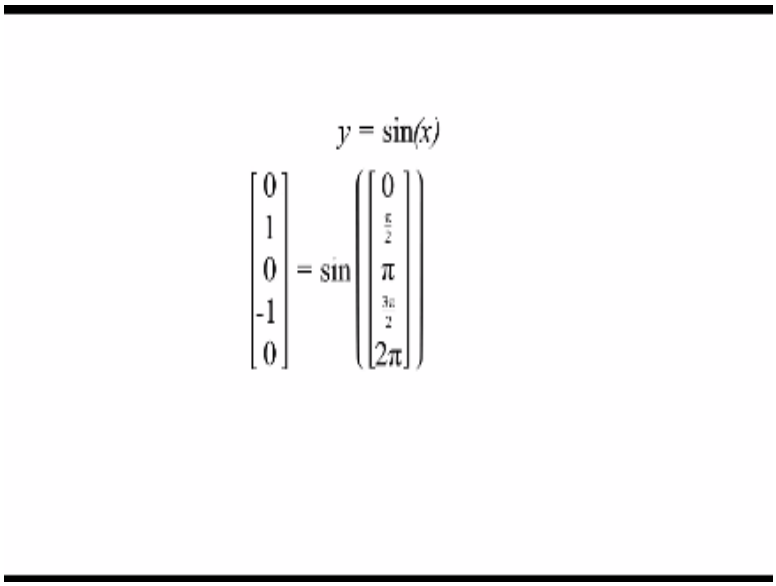


Now because MATLAB was designed for matrices mathematical functions like sin can accept a vector or matrix as an input. The output will be an array of the same size where the function is applied to each element, but MATLAB functions are more general.

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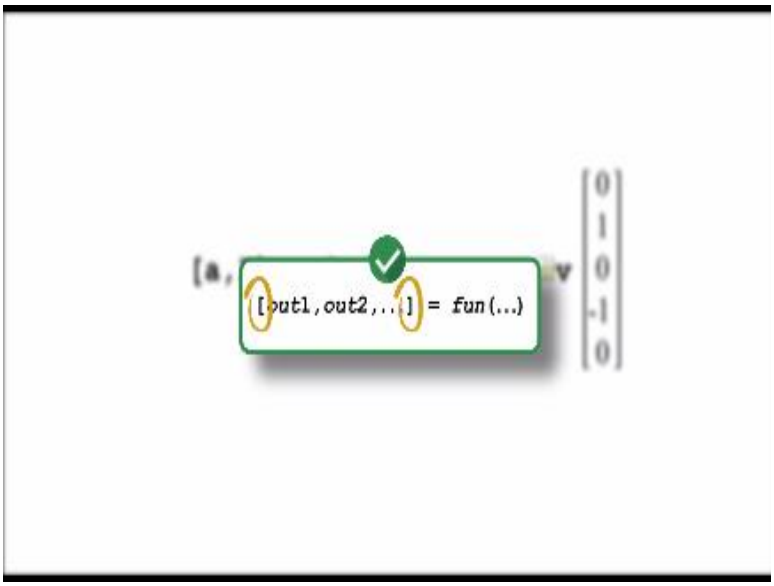


Take this command for example, what do you think it returns if you guessed negative 1 you are correct. When we pass a vector to the min function it returns the smallest value in the vector, what you may not have known is that the min function can also tell us the location of the smallest value. Here it tells us the location is for since the smallest value of the vector is -1 which happens to be the fourth element of the vector. Many MATLAB functions can return multiple outputs by asking for them individually inside a set of square brackets.

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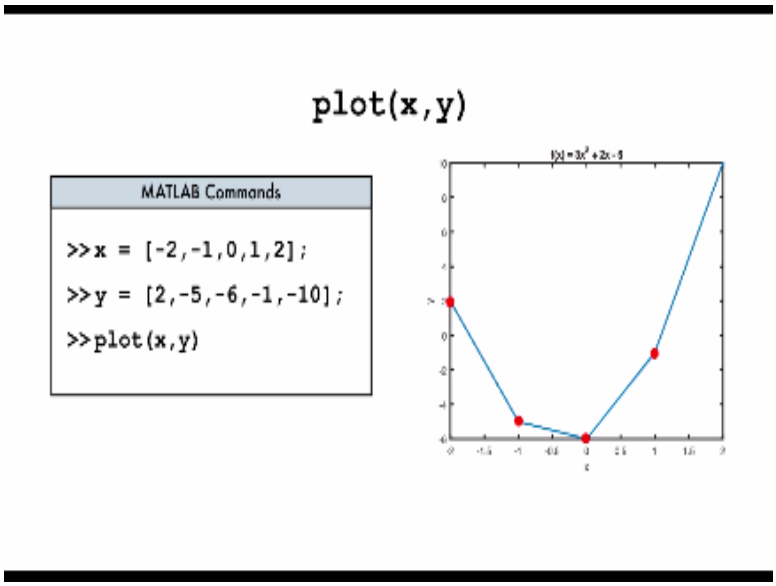


Similarly many functions accept multiple inputs the plot function takes a vector of x values and a vector of y values and generates a line plot which connects all the points represented by the xy pairs.

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If you are curious about other MATLAB functions you can look them up in the documentation each functions documentation will show it in a format that looks something like this, it will then describe the various inputs and outputs so you can learn how to use the function correctly. Try looking up a function like scatter or mean and see if you can put it to use.

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