



## Lecture 3: Introduction to Simulink

### What is Simulink?

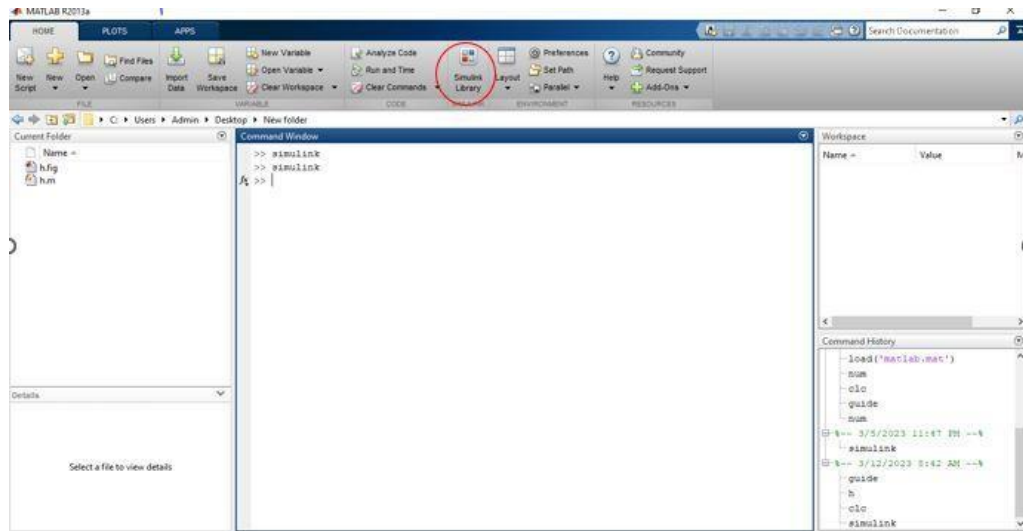
Simulink, developed by The MathWorks, is a commercial tool for modeling, simulating, and analyzing dynamic systems. Its primary interface is a graphical block diagramming tool and a customizable set of block libraries. It offers tight integration with the rest of the MATLAB environment and can either drive MATLAB or be scripted from it. Simulink is widely used in control theory and digital signal processing for simulation and design. Simulink is an environment for simulation and model-based design for dynamic and embedded systems. It provides an interactive graphical environment and a customizable set of block libraries that let you design, simulate, implement, and test a variety of time-varying systems, including communications, controls, signal processing, video processing, and image processing.

### Start using Simulink:

To start Simulink from the MATLAB:

Open MATLAB and select the Simulink icon in the Toolbar:

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Or type “Simulink” in the Command window.

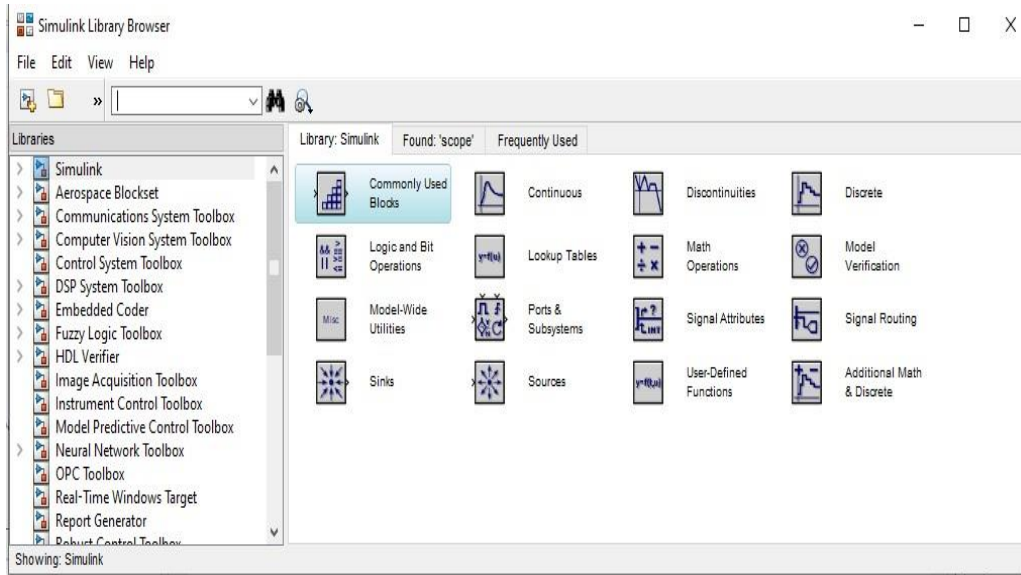
### Objects:

Simulink provides a set of block libraries, organized by functionality in the Library Browser. The following libraries are common to most workflows:

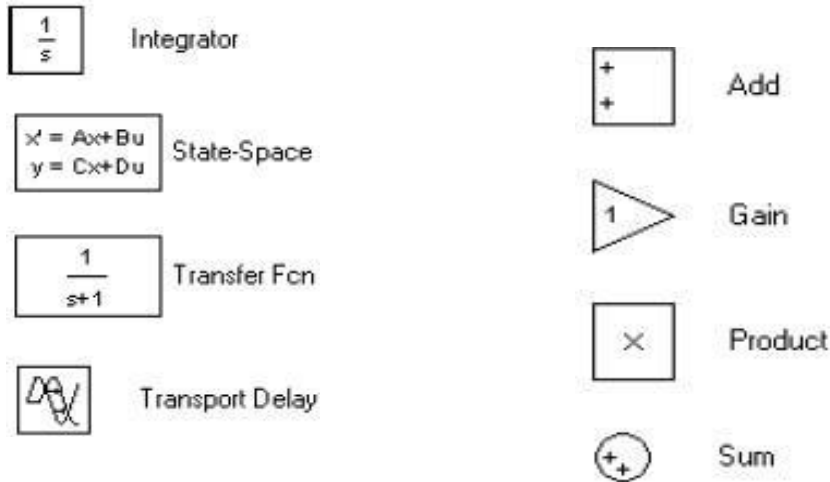
- Continuous — Blocks for systems with continuous states.
- Discrete — Blocks for systems with discrete states.
- Math Operations — Blocks that implement algebraic and logical equations.
- Sinks — Blocks that store and show the signals that connect to them.
- Sources — Blocks that generate the signal values that drive the model.
- Continuous and discrete dynamics blocks, such as Integration, Transfer functions, Transport Delay, etc.
- Math blocks — such as Sum, Product, Add, etc
- Sources— such as Ramp, Random Generator, Step, etc

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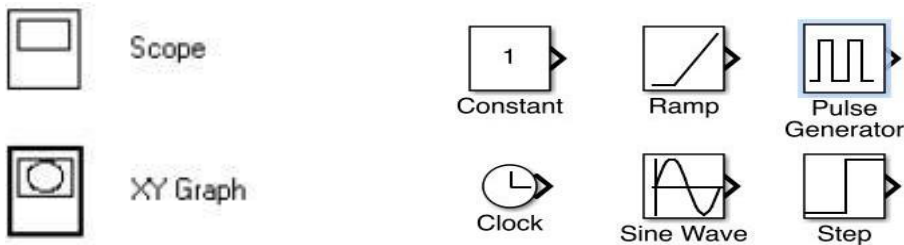
From the **Simulation** tab, click the **Library Browser** button.



### Math and Control:



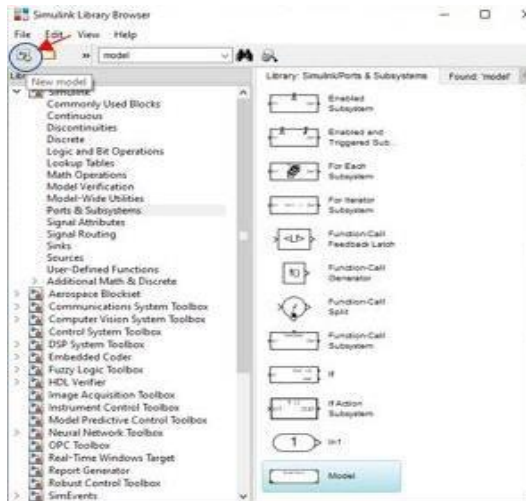
### Inputs and Outputs:



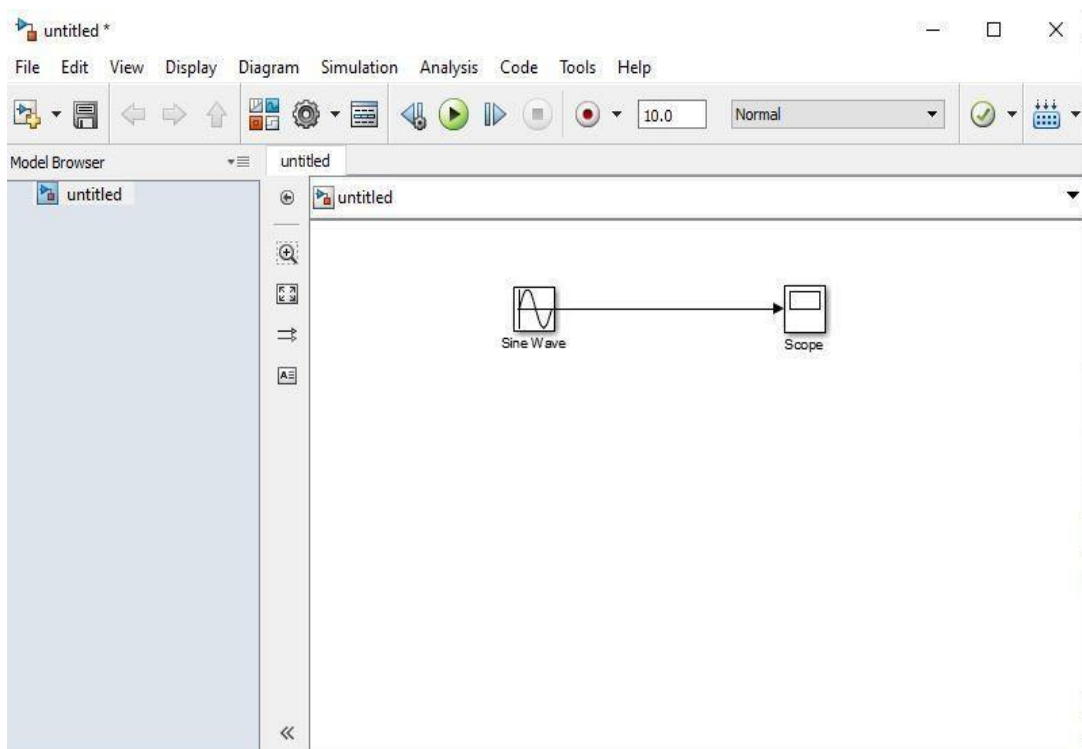
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## Experiment in MATLAB:

- Choose a new model form Simulink window.



From the Simulink library drag the following blocks into that file.( or right-click on a block and select “Add to...”)



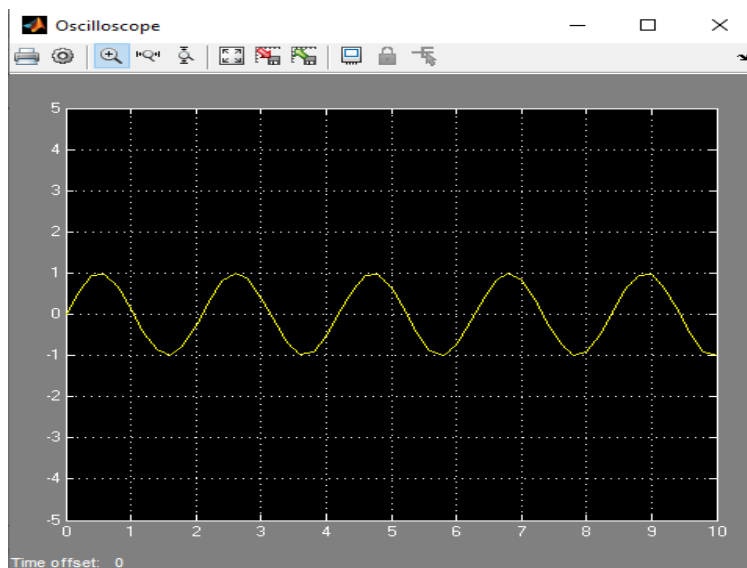
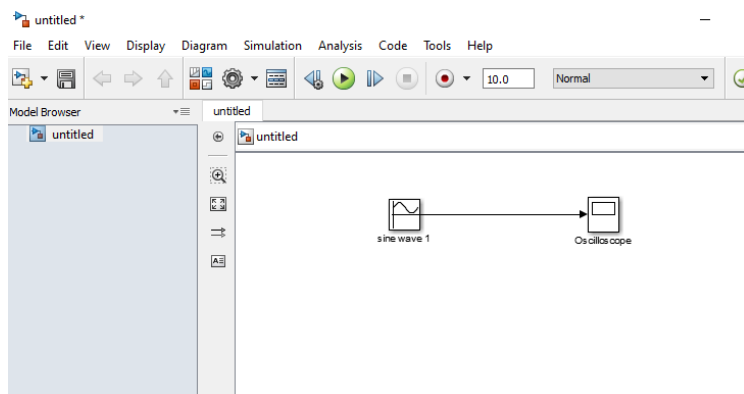
Run the simulation and double click on the scope to see the results.

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### Example1:

In this example we will:

- Place (drag and drop or add) two blocks, a Sine Wave, and a Scope, on the model surface
- Name the Blocks
- Change the input amplitude and the frequency
- Simulate the Model
- Read the output on the Oscilloscope



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**Example2:**

Simulate the following:

- Two sine waves input, both having a 3 V amplitude, 1 kHz, and a phase shift of 90 degree.
- Read the input using two channel scope

