



Al-Mustaqbal University College
Department of Medical Instrumentation Techniques Engineering
Class:3rd
Subject: Medical Communication lab.
Lecturer: Asst. Lect. Mays Khalid
Lecture: 2

Experiment No. 1 : signal generation in MATLAB

Objective:

The aim of this experiment is to learn the generation of different signals using simulations in MATLAB.

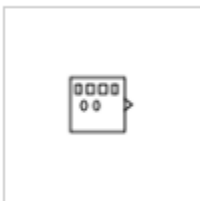
Theory:

A signal is an electromagnetic or electrical current that carries data from one system or network to another. In electronics, a signal is often a time-varying voltage that is also an electromagnetic wave carrying information, though it can take on other forms, such as current. There are two main types of signals used in electronics: analog and digital signals.

Signals transmit data between two blocks in a simulation. The data could be the calculated output of a block, or simply a message. The value of signals is calculated at all points during the simulation time. You can display the signal data and properties during and after simulation, see the real-time values on a block diagram, or you can log the values as variables in the workspace. Also, you can export the signals to a file or to a workspace to investigate further.

Signal Generator

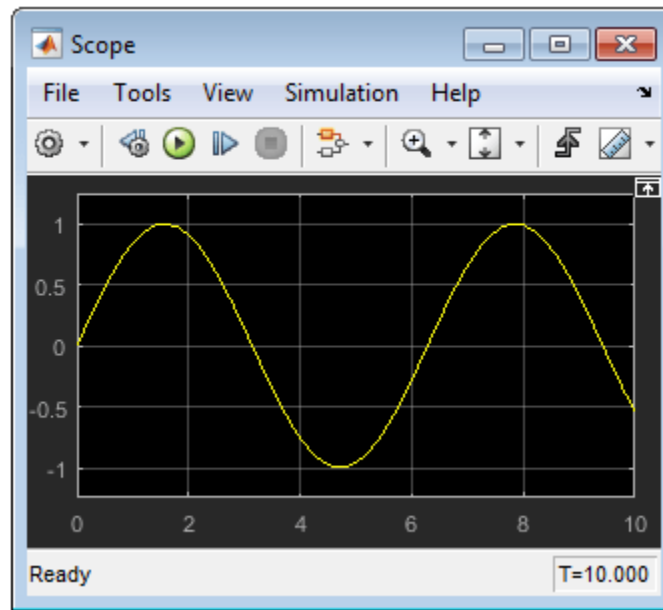
Library: Simulink / Sources



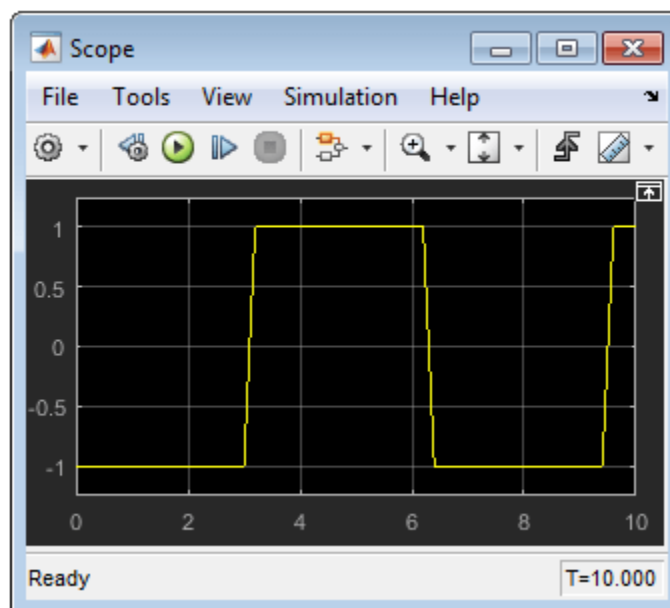


The Signal Generator block can produce one of four different waveforms:

- Sine

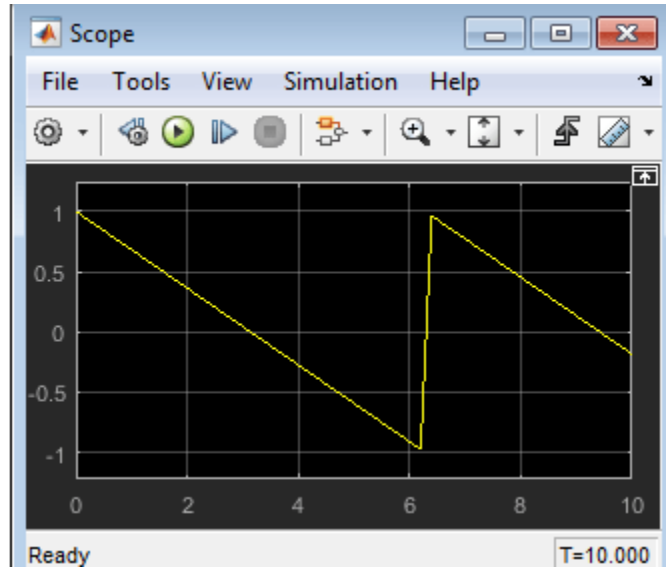


- Square

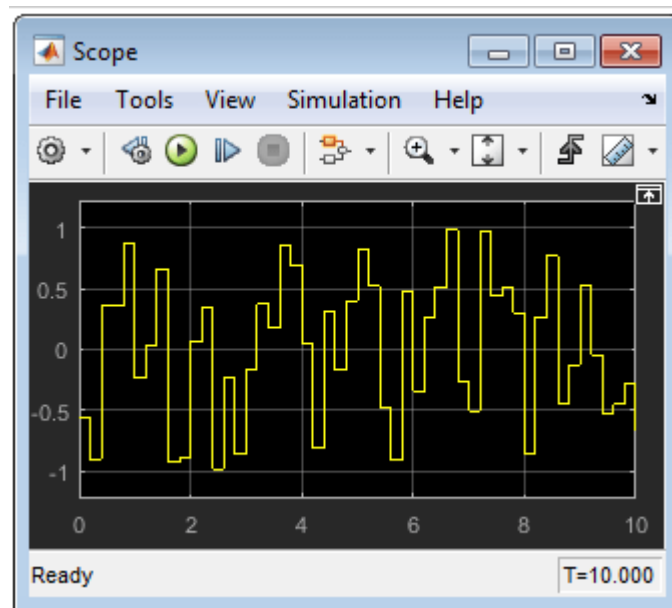




- Sawtooth



- random





Procedure 1:

Create a new form: Before creating the model, you must run MATLAB and then run the simulation.

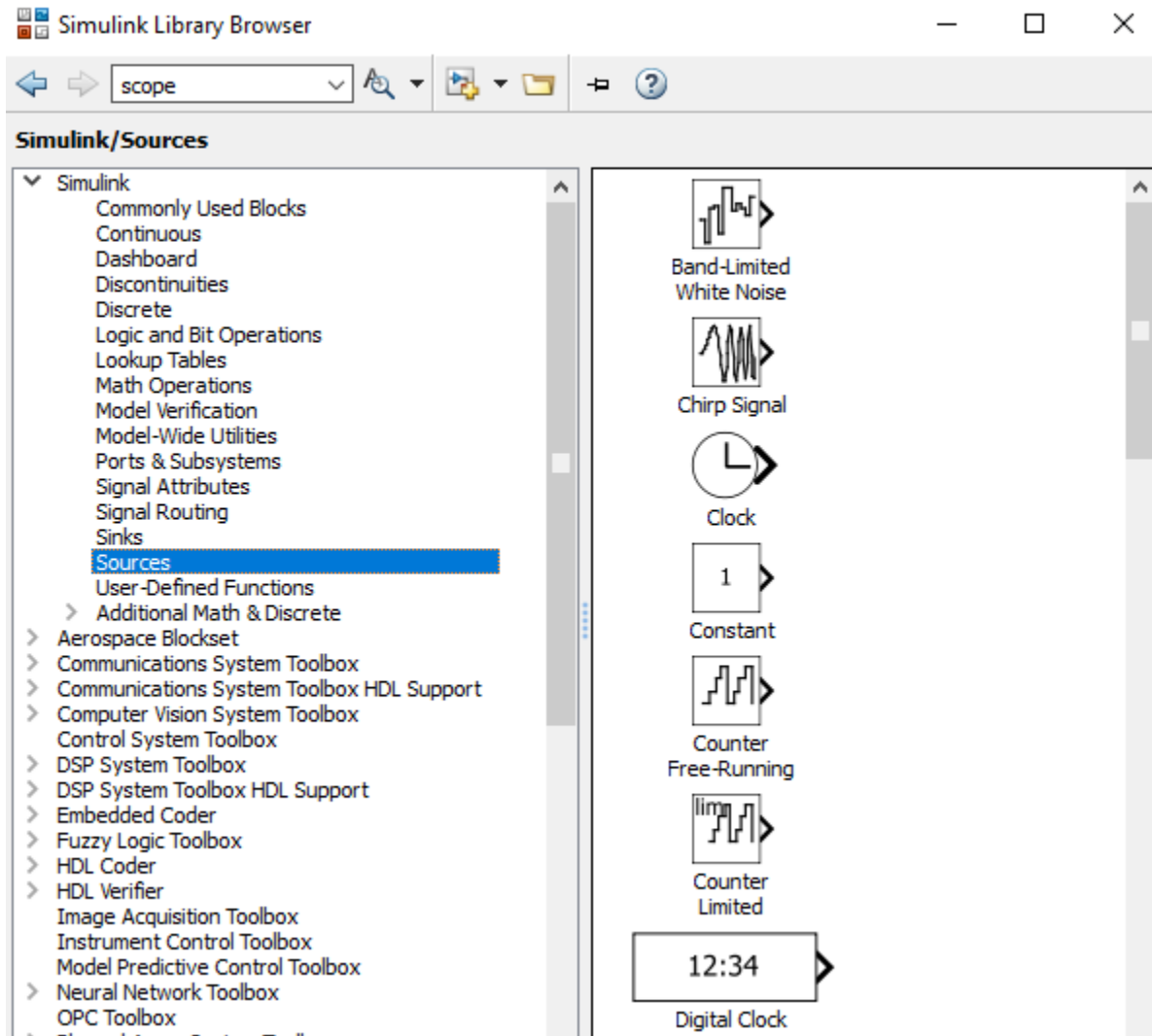
1. Start the simulation environment by typing simulink in the MATLAB command line.
2. From the simulation library browser choose File -> New -> Model and an empty simulation editor will open.
3. Choose File -> Save as. The save dialog opens.
4. In the file name type File name, type the name of your form. For example simple_model. Then press Save.

To create the model, start copying the boxes from the simulation library browser to the simulation model editor.

1. In the simulation library browser, choose the sources library. The browser shows you the boxes in the sources library in the right part of the screen.
2. Choose the signal generator box



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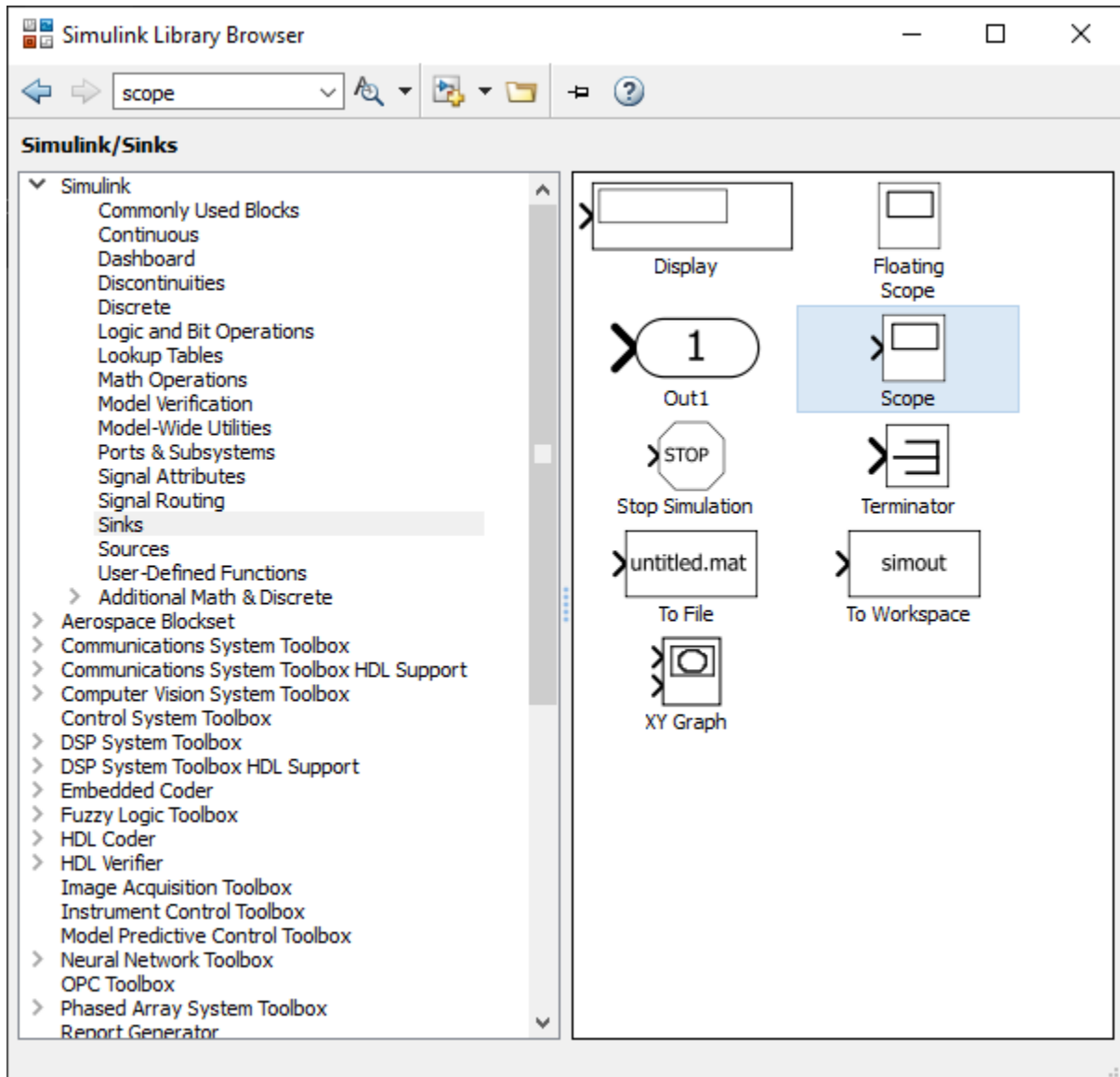


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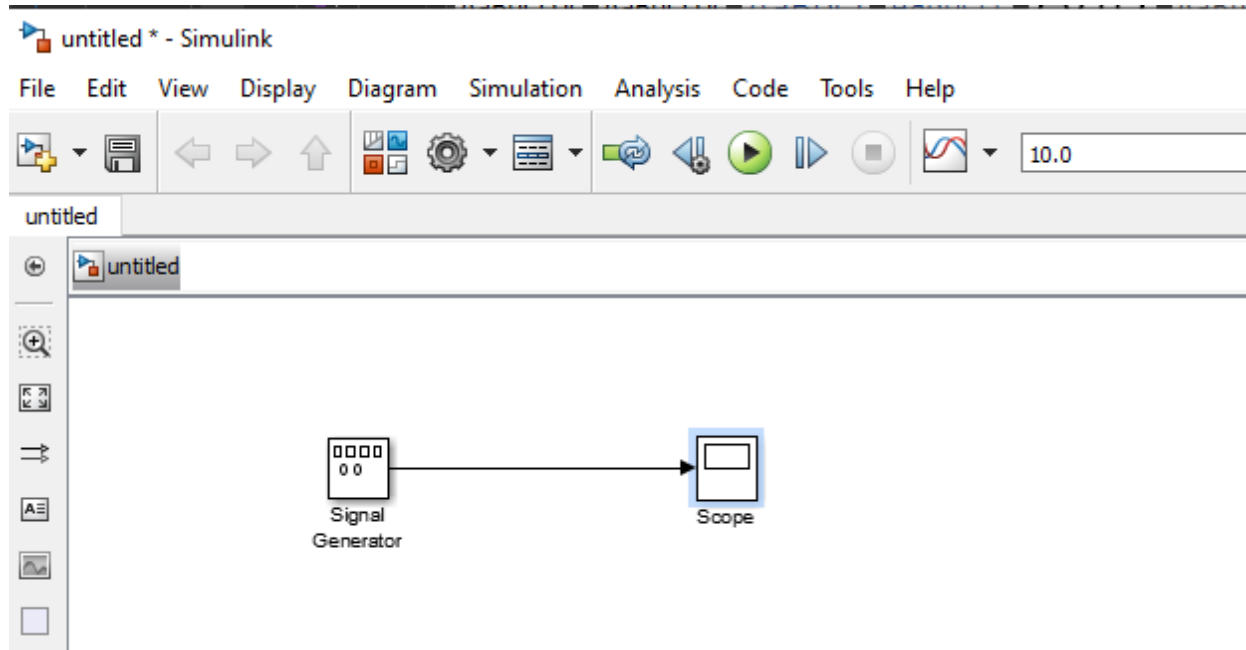
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3. Add the scope box by selecting it from the simulation library (sinks)

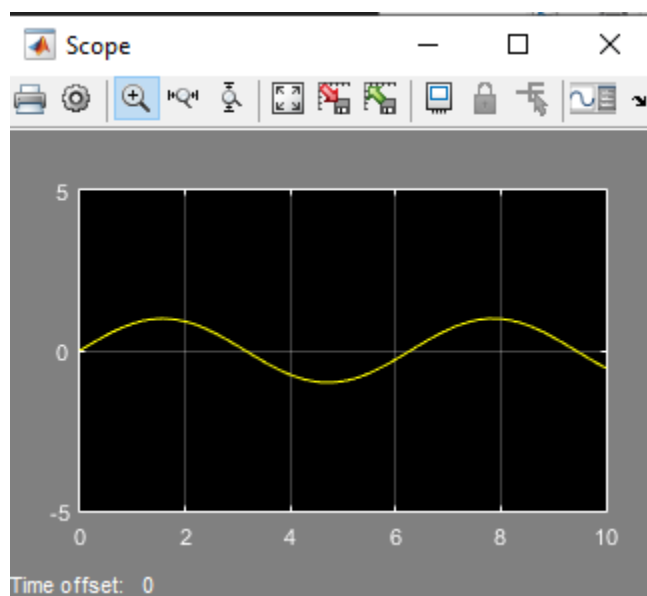




4. Connect the parts and press play

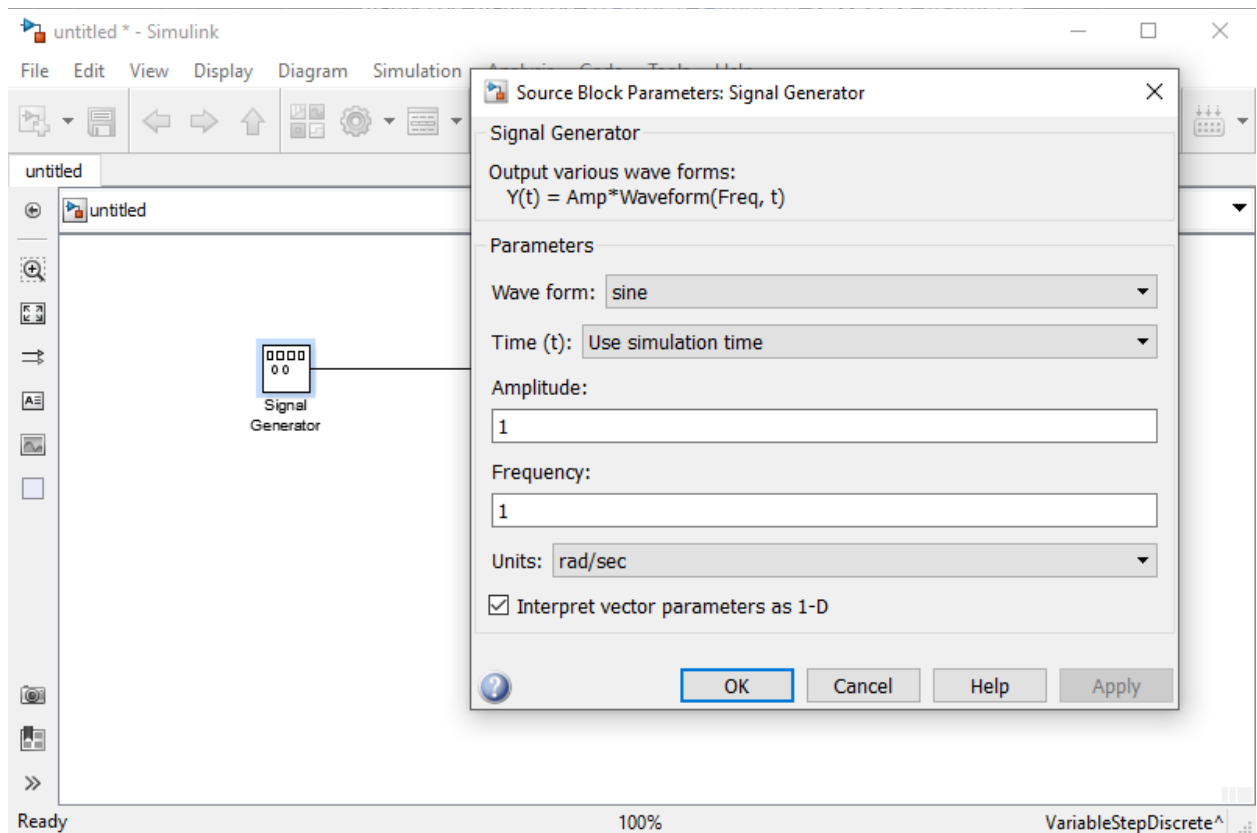


5. Click on the scope box to display the resulted signal





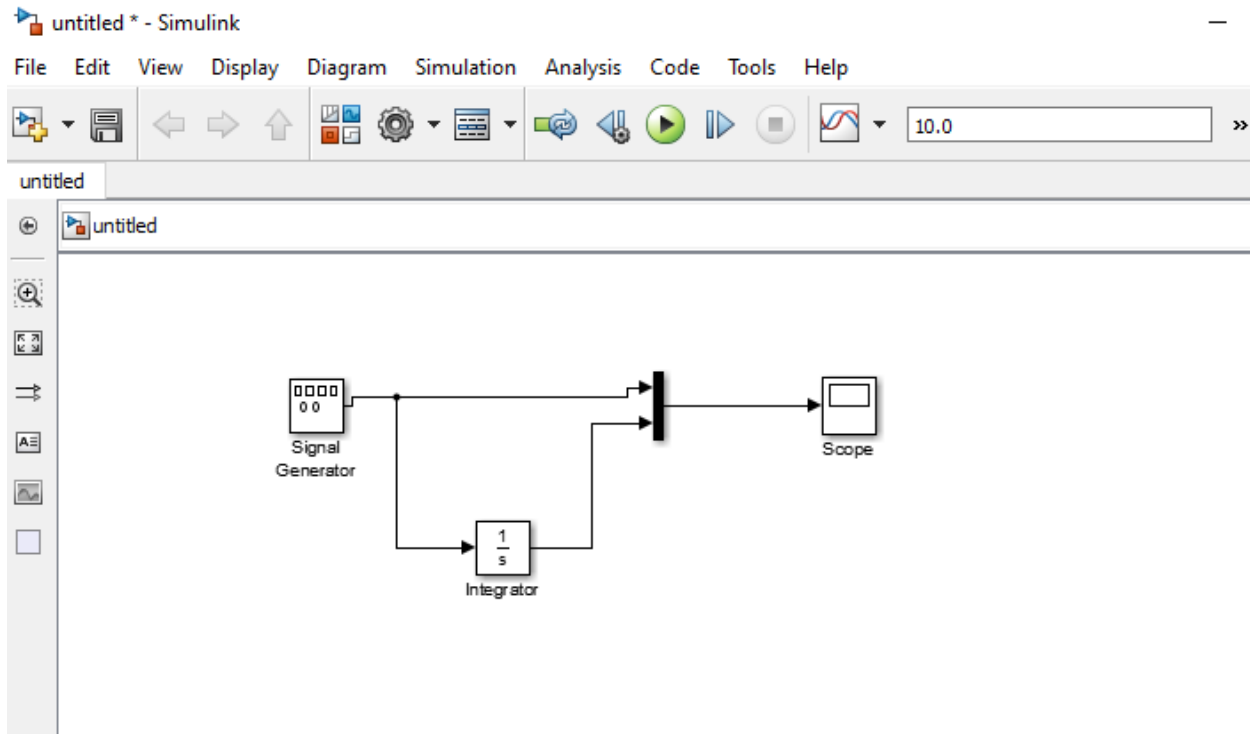
Note : The type of the displayed signal can be changed by clicking on the signal generation box and choosing the type of signal, as well as changing its amplitude and frequency





Procedure2:

To make the following form, follow these steps:



- 1- Open a new Simulink model window
- 2- From the simulation library, select the following boxes:

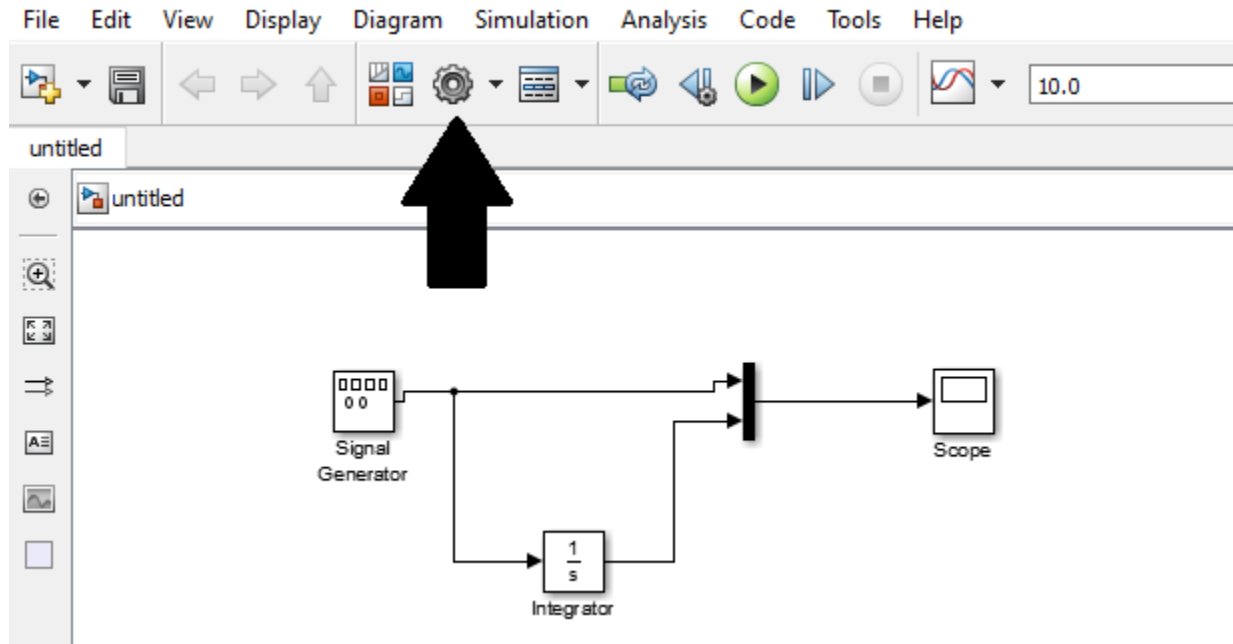
Library	Box name
sources	Signal generator
sinks	scope
Signal routing	mux
continuous	integrator

- 3- Adjust the simulation settings

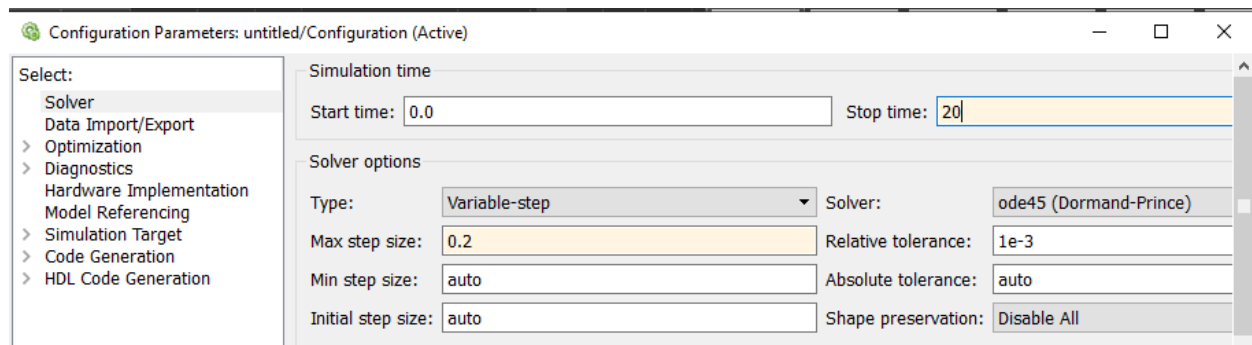
Before simulating the model, the settings must be adjusted.



In the simulation editor, choose Simulation -> Model Configuration Parameters. A dialog box for setting parameters will open in the Solver pane.



In the Stop time field, put a value of 20. In the Max Step size field, put 0.2.



Click apply .

4- Click the play button and display the signal



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