HÁSKÓLINN Í REYKJAVÍK
REYKJAVIK UNIVERSITY

Quick Introduction to Simulink

By:

Arash Sheikhlar

What is Simulink:

Simulink is a MATLAB-based graphical programming environment for:

Modeling, **Simulating**, and **Analyzing** dynamical systems.

Usage:

- Designing Model-Based Control Systems
- Automation
- Digital Signal Processing

“Example isn't another way to teach, it is the only way to teach.” - Albert Einstein

*As a simple **example** of dynamic systems:*

Assume that we have a system with the following equation:

$$\dot{x}\ (t) + 10x(t) = u(t)$$

u(t) : input
x(t) : output
$\dot{x}\ (t)$: dx/dt
x(0)= -10, initial value of x(t)

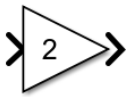
$$\dot{x}\,(t) + 10x(t) = u(t)$$

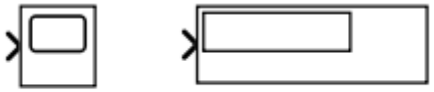
u(t) : input
x(t) : output
$\dot{x}\,(t)$: dx/dt
x(0)= -10, initial value of x(t)

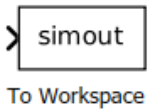
Inputs: We can give the system several types of signals as the input:

Connections: Conncet the elements by drawing lines!

Add block: Add signals via "Sum" block: 

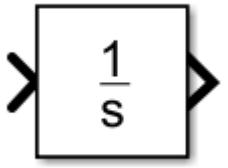
Gains: Give weight to the signals/connections by "gain"s: 

Scopes: How to observe the signals in time: 

Simout: How to save data: 

Integrator

The most **integral** element of building dynamic models:



$Why???$

	Time domain	s domain
Time-domain integration	$\int_0^t f(\tau)\,d\tau$	$\frac{1}{s}F(s)$

When you have initial values, put it into the integral block.

MATLAB function

Don't forget to use MATLAB function when the Simulink does not provide you the desired block/function (or even when you don't find it)

This block contains one/multiple input(s) and one/multiple output(s). Write the code and generate your outputs.

MATLAB Function

The Simulink block diagram, the input and the output will be something like this: