

Department of Electrical Engineering

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Semester: **4th Semester**

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EE-232 Signals and Systems

Lab Report #7 Linearity in Simulink MATLAB

Objectives

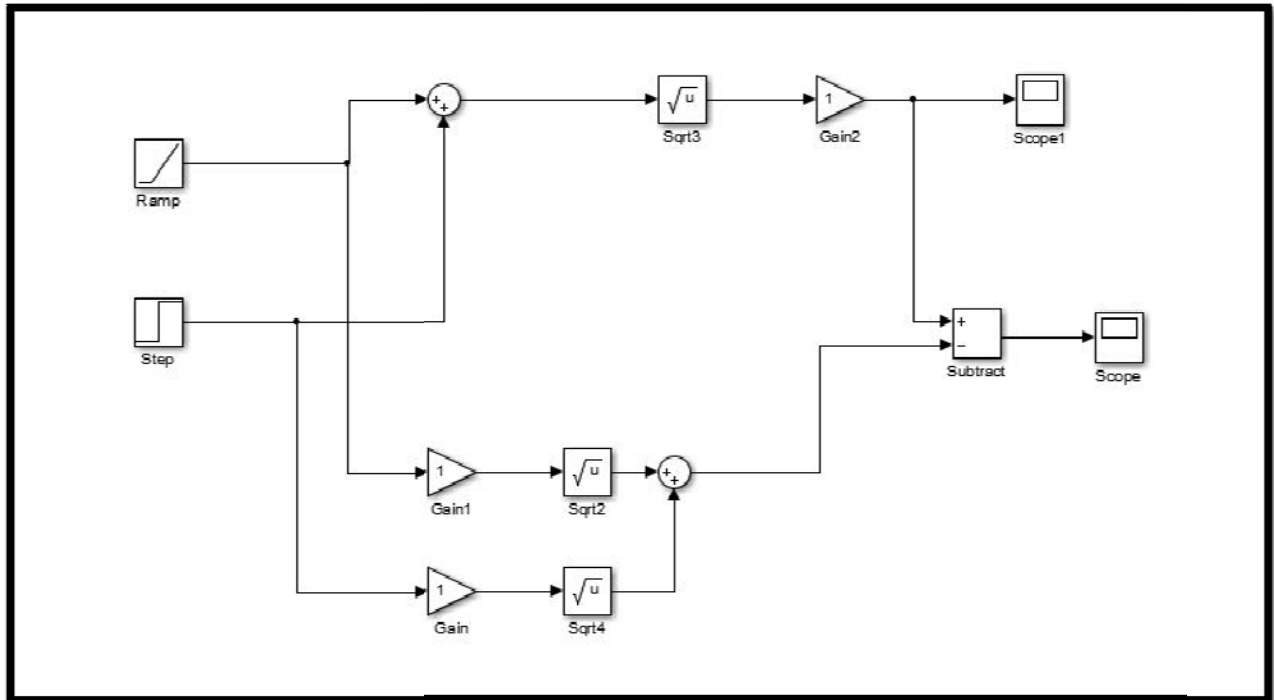
The goal of this exercise is to gain familiarity with the handy simulations provided in MATLAB and to make simulation that would describe linearity.

- Understanding concept on linearity
- Get familiarization with simulink

Exercise No.1:

Proving non-linear behavior of square root function:

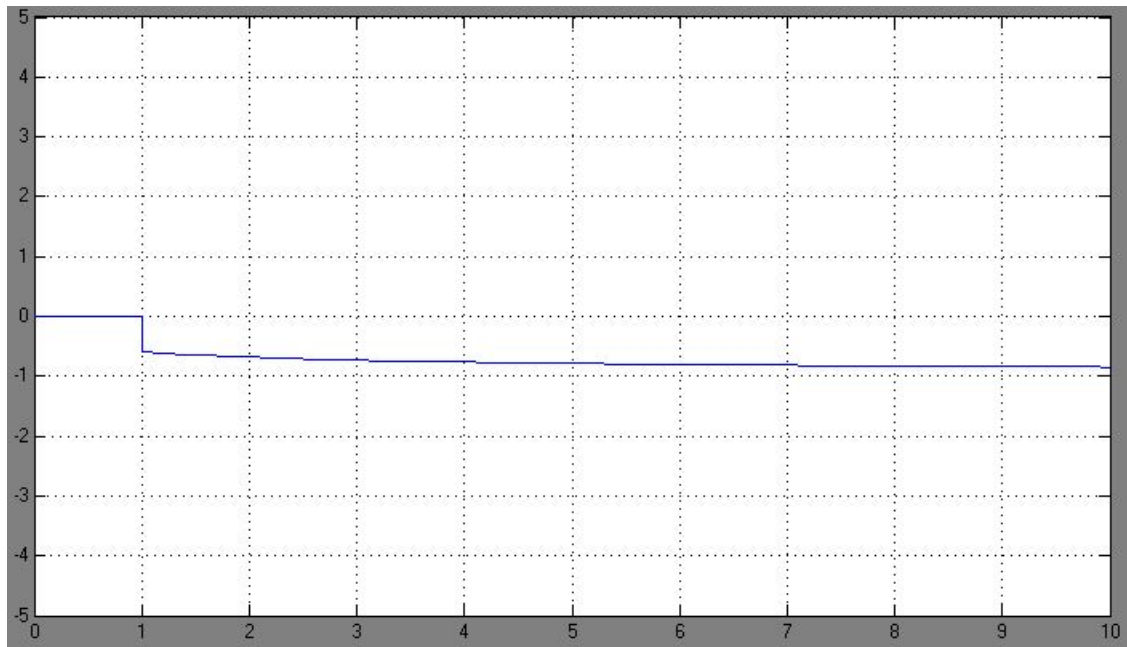
- Ramp function with slope 1
- Step function of height 1 and delay by 1 units
- Gain or scale factor is 1



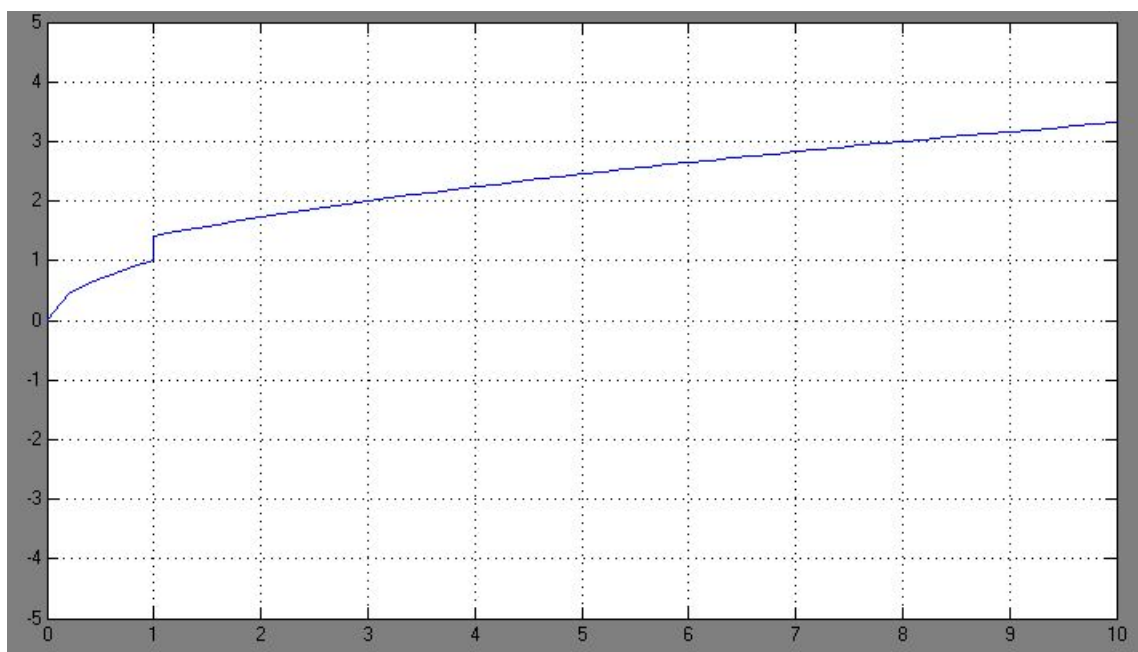
Simulink flow Diagram

Function:

- $F(x)$ indicate Square root of x .
$$F(X+Y) \neq F(X) + F(Y)$$
- L:H:S is shown in scope1
- L:H:S – R:H:S is shown in scope



Scope (L:H:S - R:H:S)



Scope1 (L:H:S)

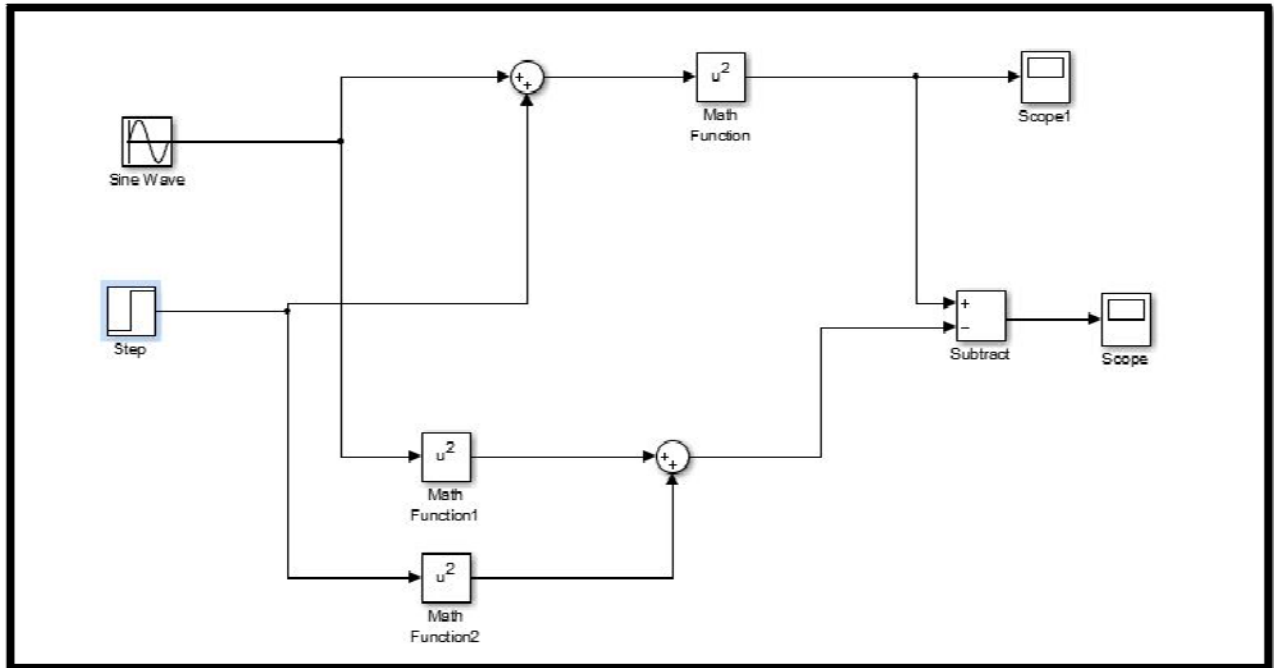
Result:

As, $L:H:S - R:H:S$ is not zero, therefore function/system is non-linear.

Exercise No.2:

Proving non-linear behavior of squaring function:

- Sine function of frequency (rad/sec) is 1
- Step function of height 1 and delay by 3 units
- Function is squaring the signal

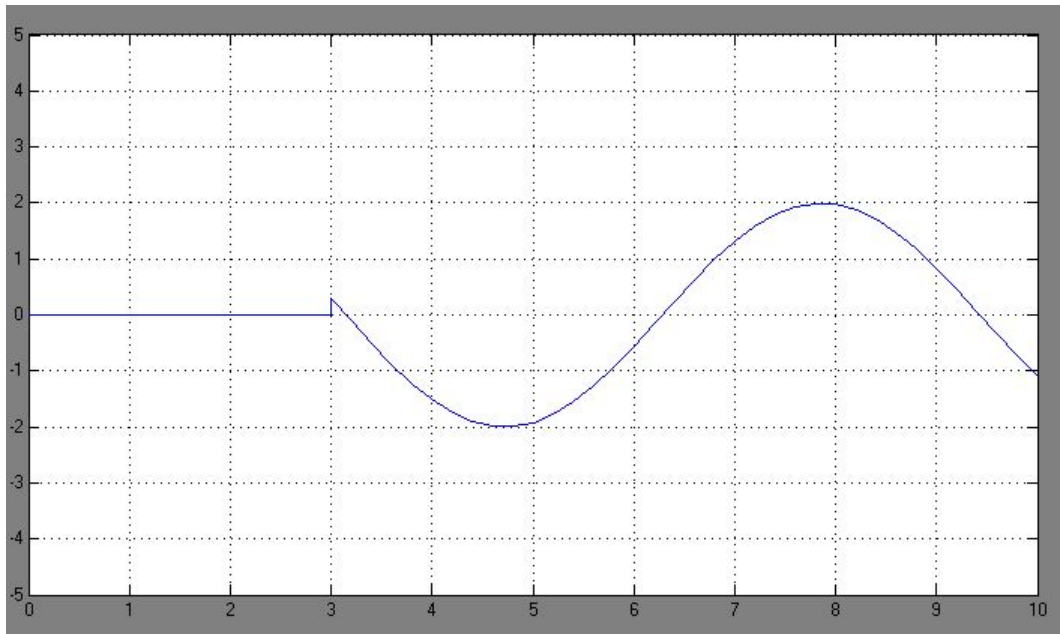


Simulink flow Diagram

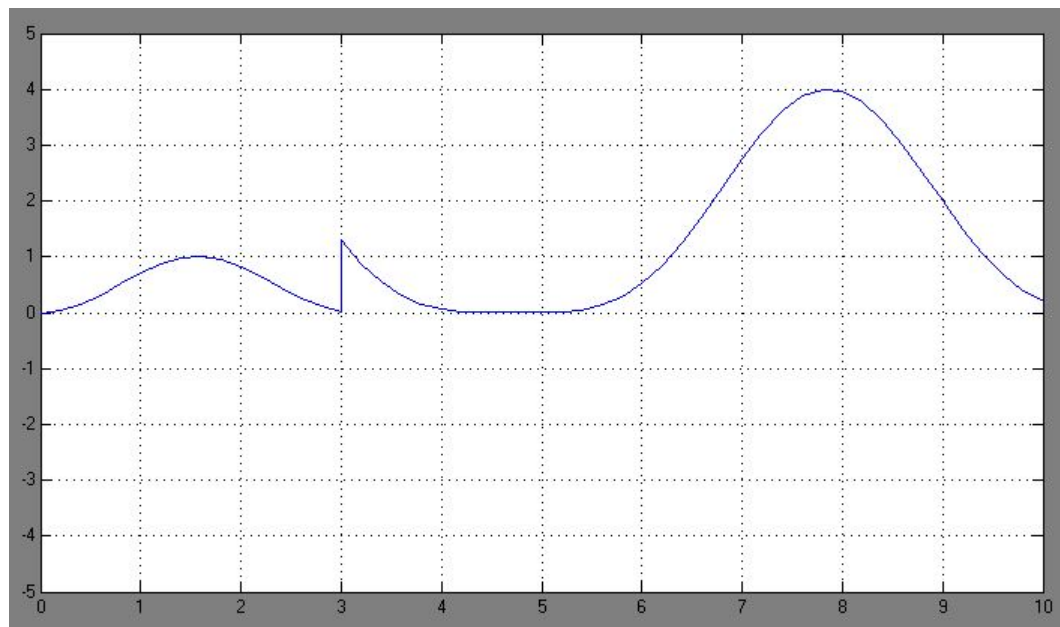
Function:

$$(X+Y)^2 \neq (X)^2 + (Y)^2$$

- L:H:S is shown in scope1
- L:H:S – R:H:S is shown in scope



Scope (L:H:S - R:H:S)



Scope1 (L:H:S)

Result:

As, $L:H:S - R:H:S$ is not zero, therefore squaring function\system is non-linear.

Conclusion:

In this lab, we figure out how to use simulink in matlab and understand linearity with the help of example in simulink for various functions.