Lab report no 2

Fall 2022

Control System Lab

Submitted By

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Section: **A**
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Objectives: -

- **To learn how to find impulse response of LTI system MATLAB.**
- **To understand usage of transfer function.**
- **To learn how to pass different input signal to the system.**
- **To practice all of these tasks in Simulink of MATLAB.**
- **And to Compare code and Simulink outputs.**

Task no 1: -

Find impulse response of LTI system using simulink in matlab. For following expression of system 100/x2+4x+20.

```
clc
clear all
close all

t=0:0.01:40;



num = [100];
denum =[1 4 20];

sys = tf( num,denum);
```

Task no 2: -

Pass the sinusiodal signal as input through the system.

```
%sinusiodal input
u = sin(t);
y1 = lsim(sys,u ,t);
```

Task no 3: -

Addition of task1 and task2.

```
y2 = step(sys,t);
y3 = step(sys, 5:0.01:40);

temp = zeros(500,1);
y3 =[temp;y3];

y = y1+y2+y3;
```

Task no 4: -

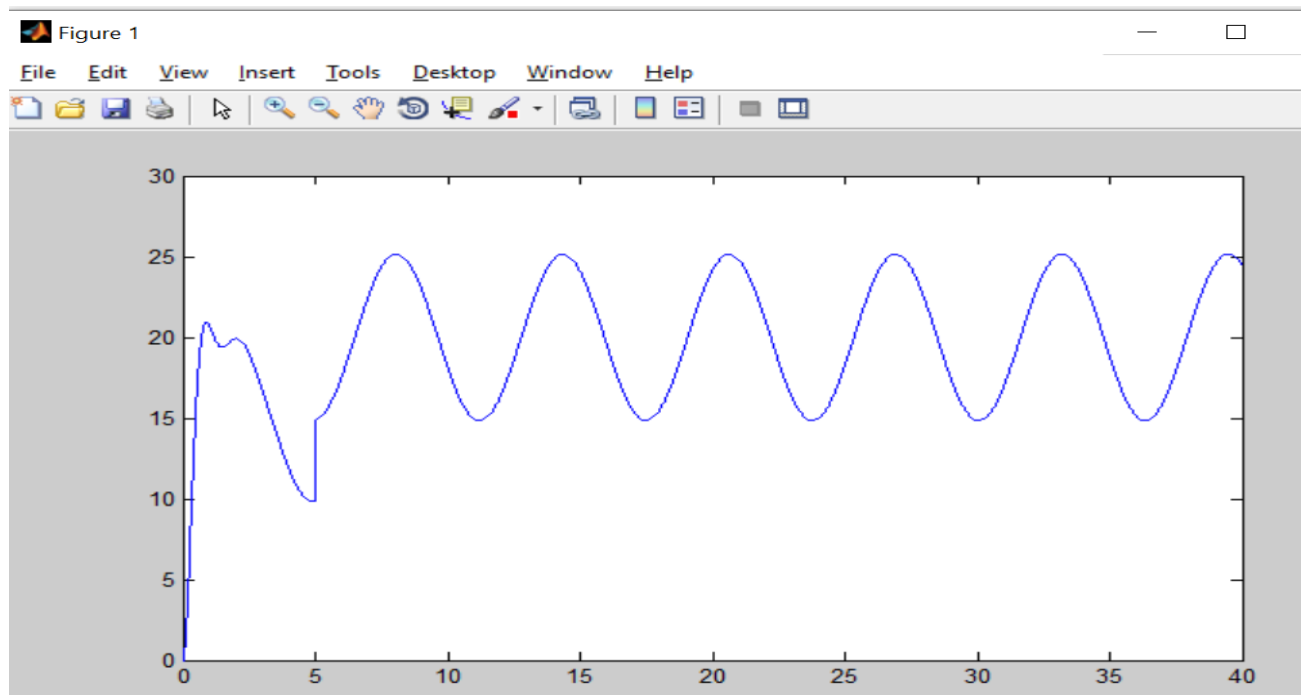**Square wave with time period 10sec and simulation time 40sec.**

```
t1 = 0:0.01:40;

ysqr = 2*square(2*pi*0.01*t1);
y_sqr =lsim(sys, ysqr, t1);
```

Task no 5: -

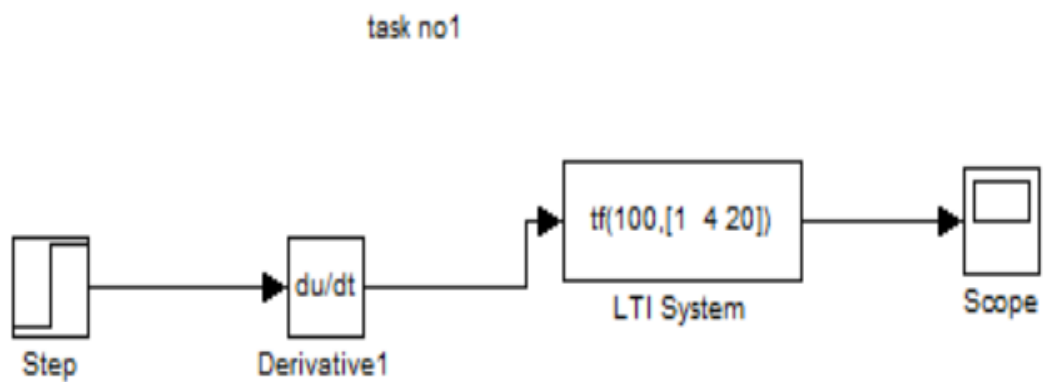**Add task4 with resultant of task3 and then plot across the time ranged 40sec.**

```
com = y_sqr + y;
plot(t1,com);
```
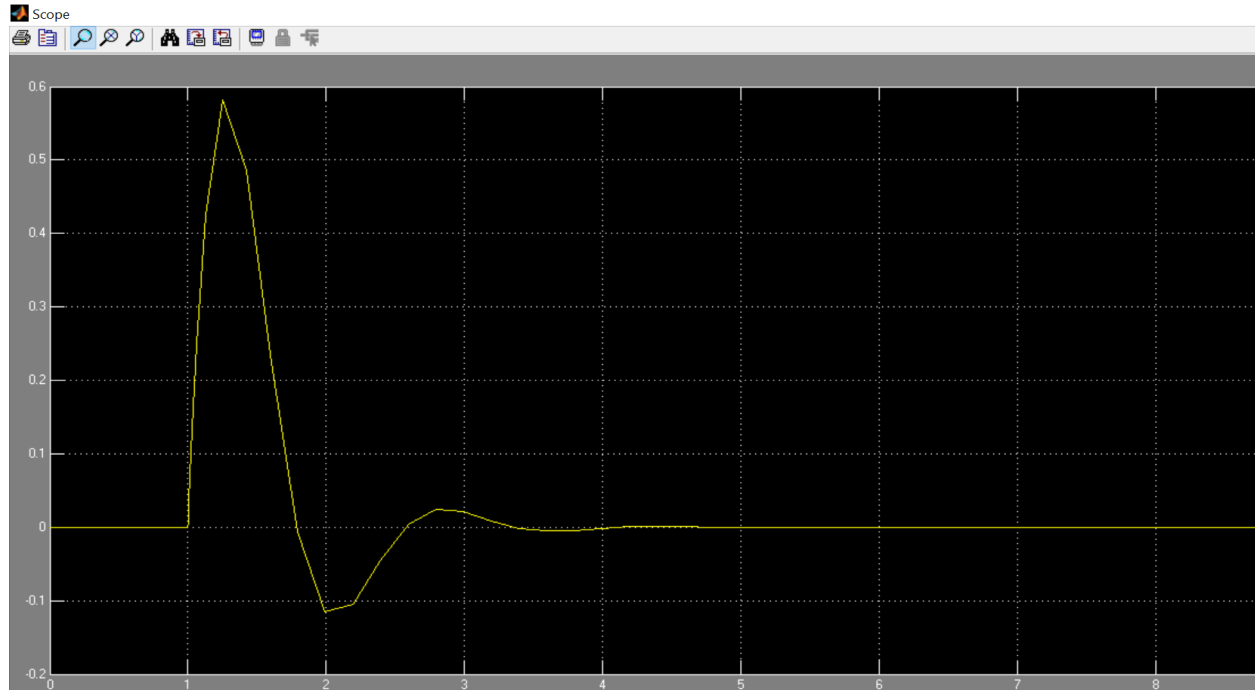
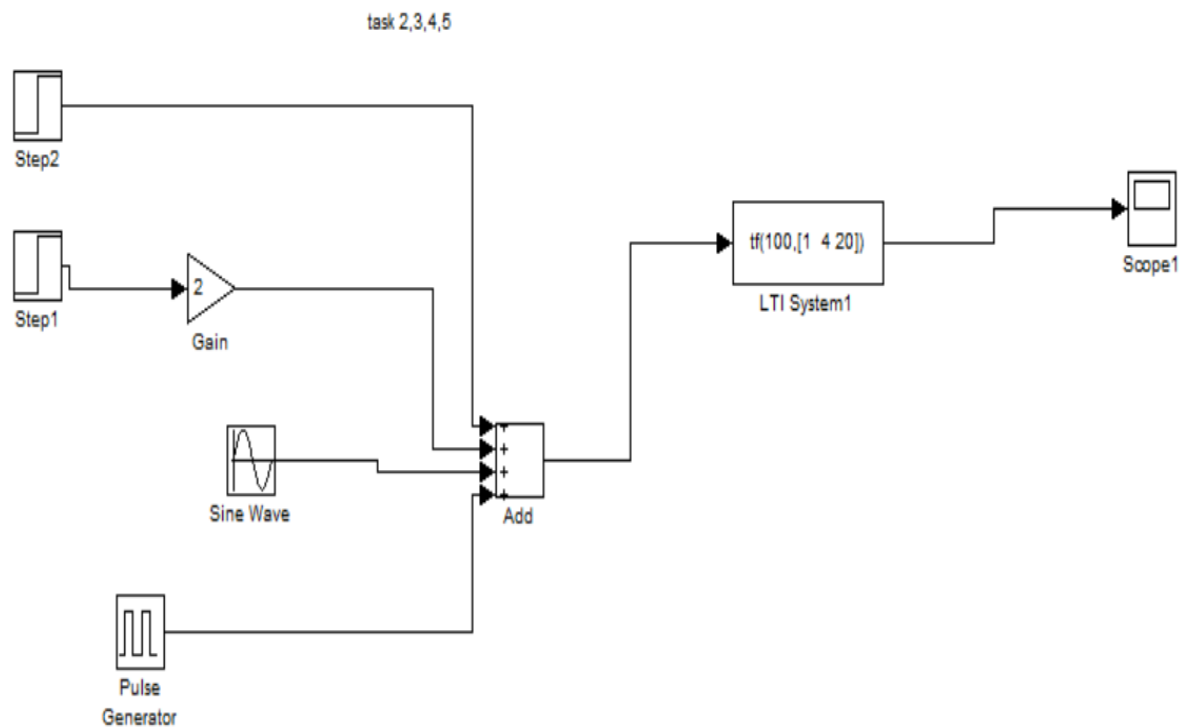## Final Plot : -

Simulink design: -

Same work (all 5 tasks) design by different block components in simulink.
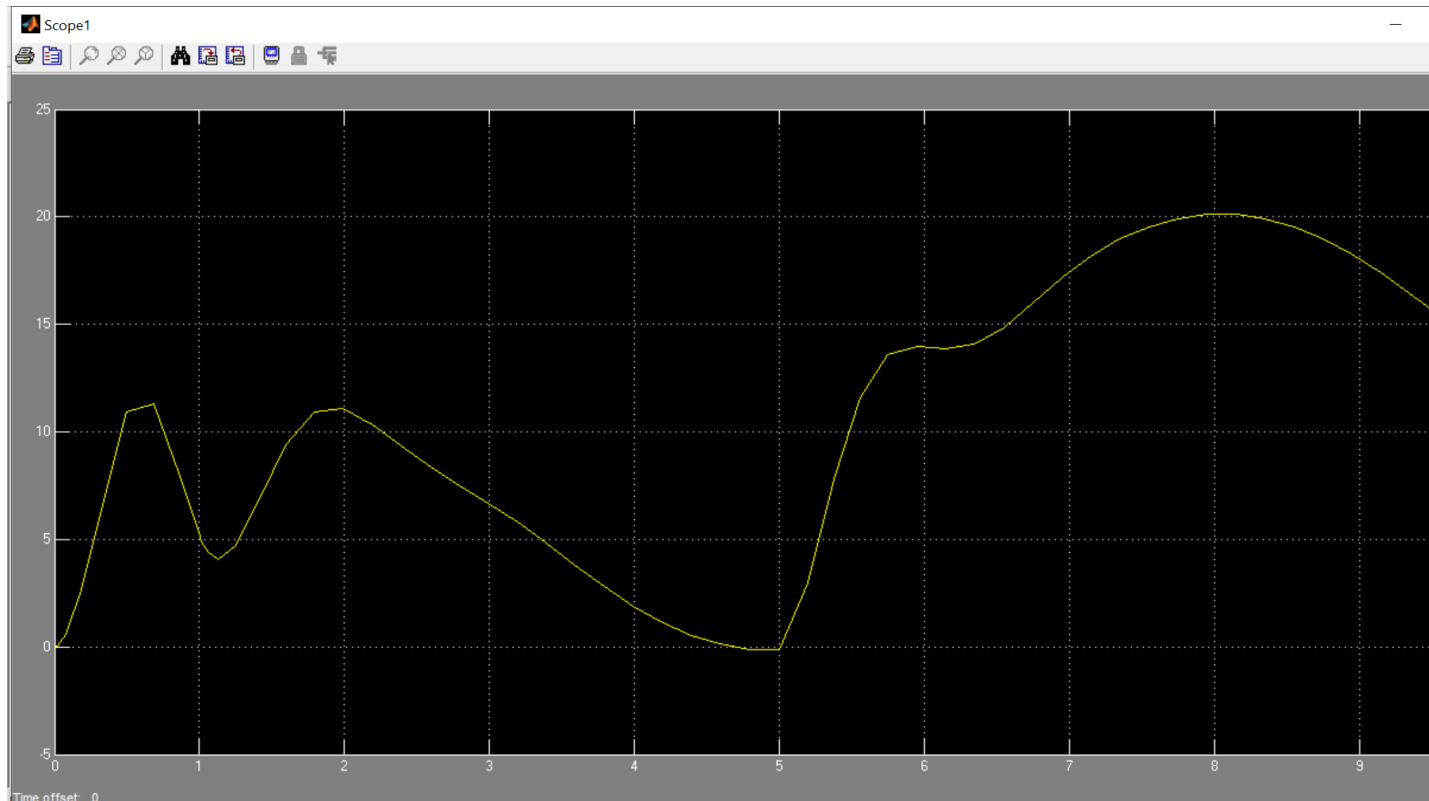
task no1

Task 1 scope output: -

Simulink design: -

task 2,3,4,5

Final scope output: -

Comparision: -

We have seen that both final graphic outputs are same to some extent, but not exactly the same because of some internal delays and others difference of displays view.