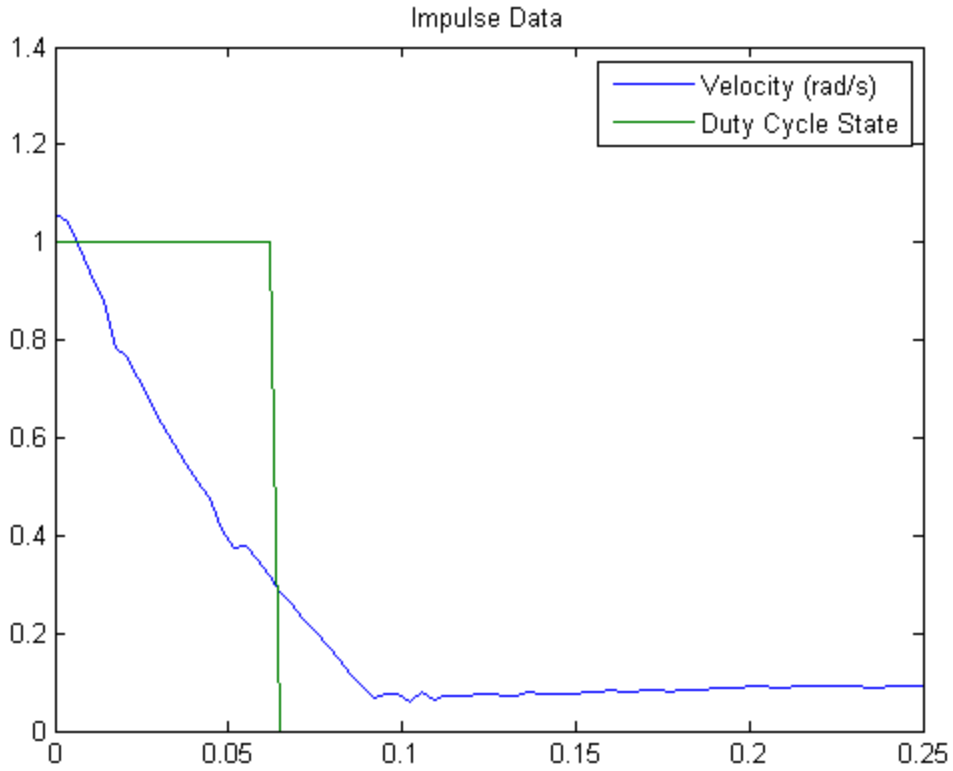
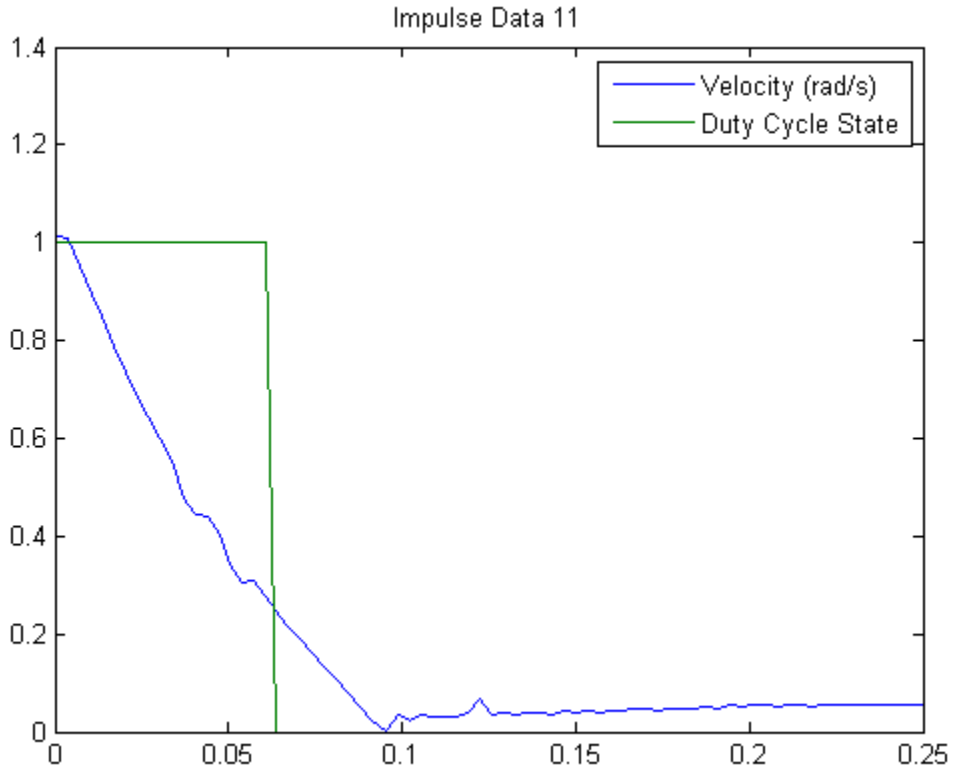
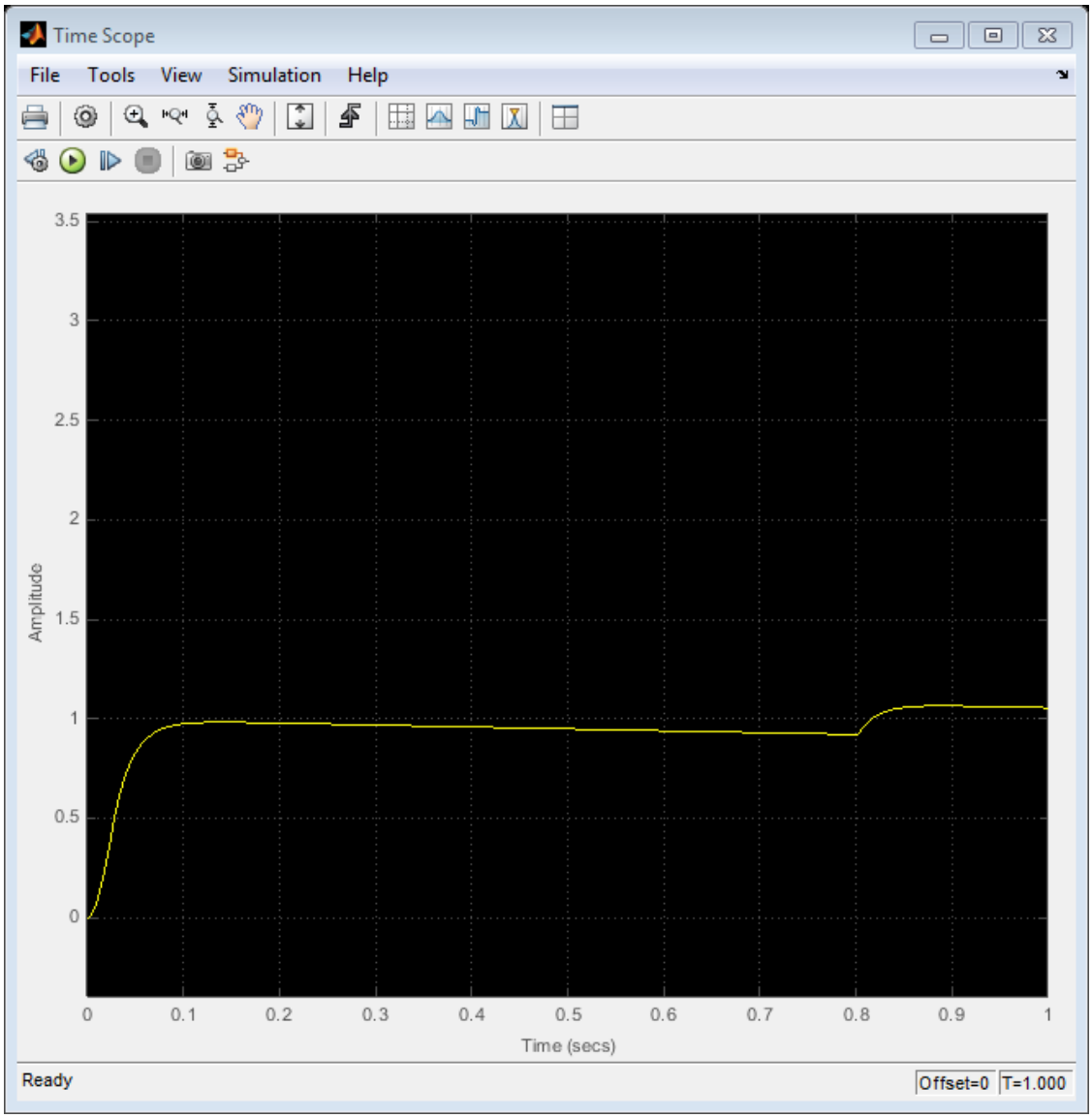
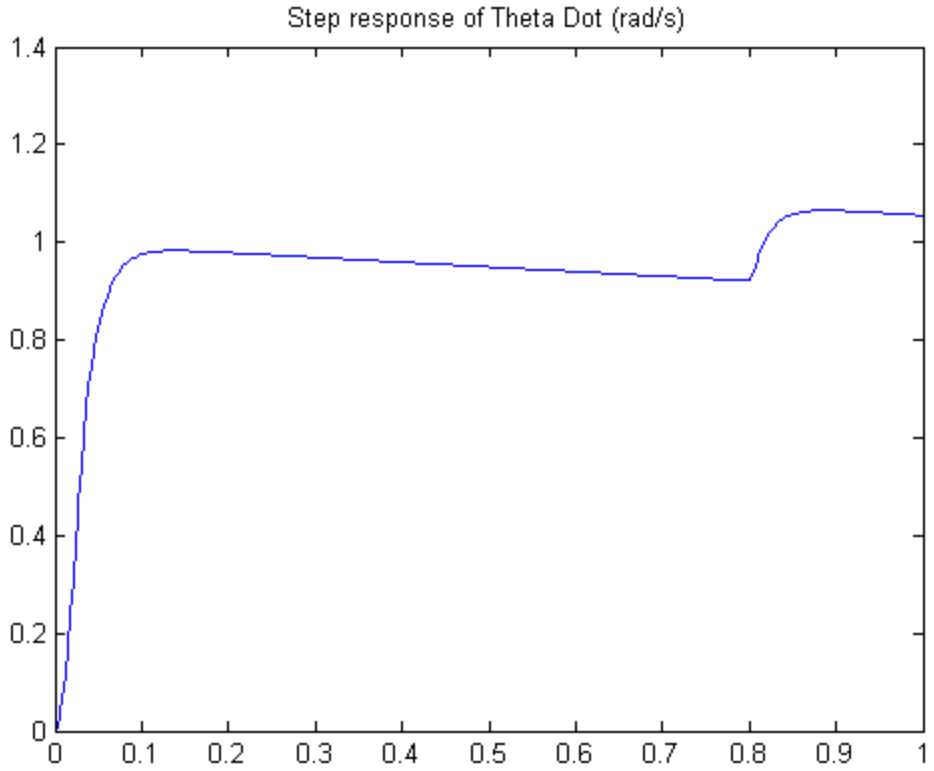
```
close all
clear

%import all trial data and split the runs and time start at zero

data = importdata('data.txt');
state0 = data(:,1);
state0 = state0(8:end);
time0 = data(:,3);
time0 = time0(8:end);
time0 = time0 - time0(1);
vel0 = data(:,2)*-1;
vel0 = vel0(8:end);

data = importdata('impulse1.txt');
state1 = data(:,1);
time1 = data(:,3);
vel1 = data(:,2);

state11 = state1(8:2924);
time11 = time1(8:2924);
time11 = time11 - time11(1);
vel11 = vel1(8:2924)*-1;

%Graph all the collected data
figure
plot(time0,vel0,time0,state0)
legend('Velocity (rad/s)','Duty Cycle State')
title('Impulse Data')
xlim([0 .25])

figure
plot(time11,vel11,time11,state11)
legend('Velocity (rad/s)','Duty Cycle State')
title('Impulse Data 11')
xlim([0 .25])
```

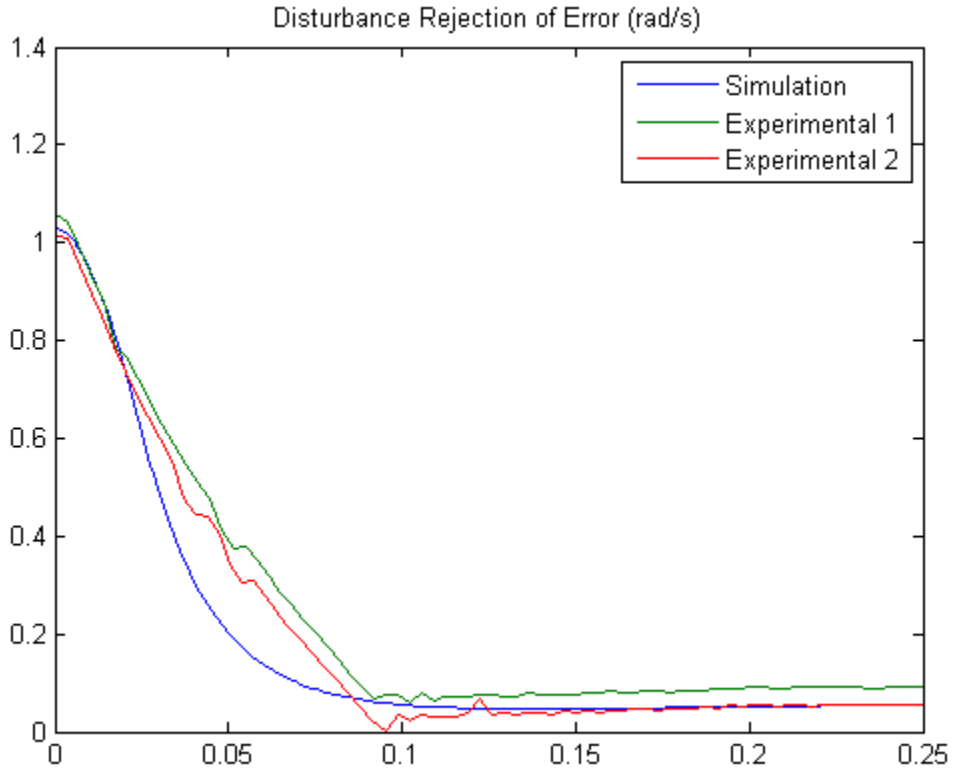

Impulse Data
Velocity (rad/s)
Duty Cycle State
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.05
0.1
0.15
0.2
0.25


Impulse Data 11
Velocity (rad/s)
Duty Cycle State
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.05
0.1
0.15
0.2
0.25

```
%define model variables
I = 0.0198;
Ftot = 11;
fr = 2.75*.0254;
b = 0.002;
a = 2;   %I/(Ftot*ct*fr)
Tau = 0.02;
hz = 10;

simout = sim('rocket_roll_sim.slx');

 figure
plot(theta_dot.time,theta_dot.signals.values)
title('Step response of Theta Dot (rad/s)')

figure
plot(error.time,error.signals.values,time0,vel0,time11,vel11)
legend('Simulation','Experimental 1','Experimental 2')
title('Disturbance Rejection of Error (rad/s)')
xlim([0 .25])
```


Time Scope
File
Tools
View
Simulation
Help
3.5
3
2.5
2
1.5
1
0.5
0
Amplitude
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Time (secs)
Ready
Offset=0
T=1.000


Step response of Theta Dot (rad/s)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1


Disturbance Rejection of Error (rad/s)
Simulation
Experimental 1
Experimental 2
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.05
0.1
0.15
0.2
0.25

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