PID TUNING ASSIGNMENT

NWANKWO CHUKWUERIKE MARK

17/MHS01/205

BIOMEDICAL ENGINEERING

ZIEGLAR-NICHOLS OPEN-LOOP TUNING RULE

clear all

clc

num=[1]

den=[2 1]

sys=tf(num, den)

H=1

M=feedback(sys,H)

step(M)

hold on

kp=15

ki=4

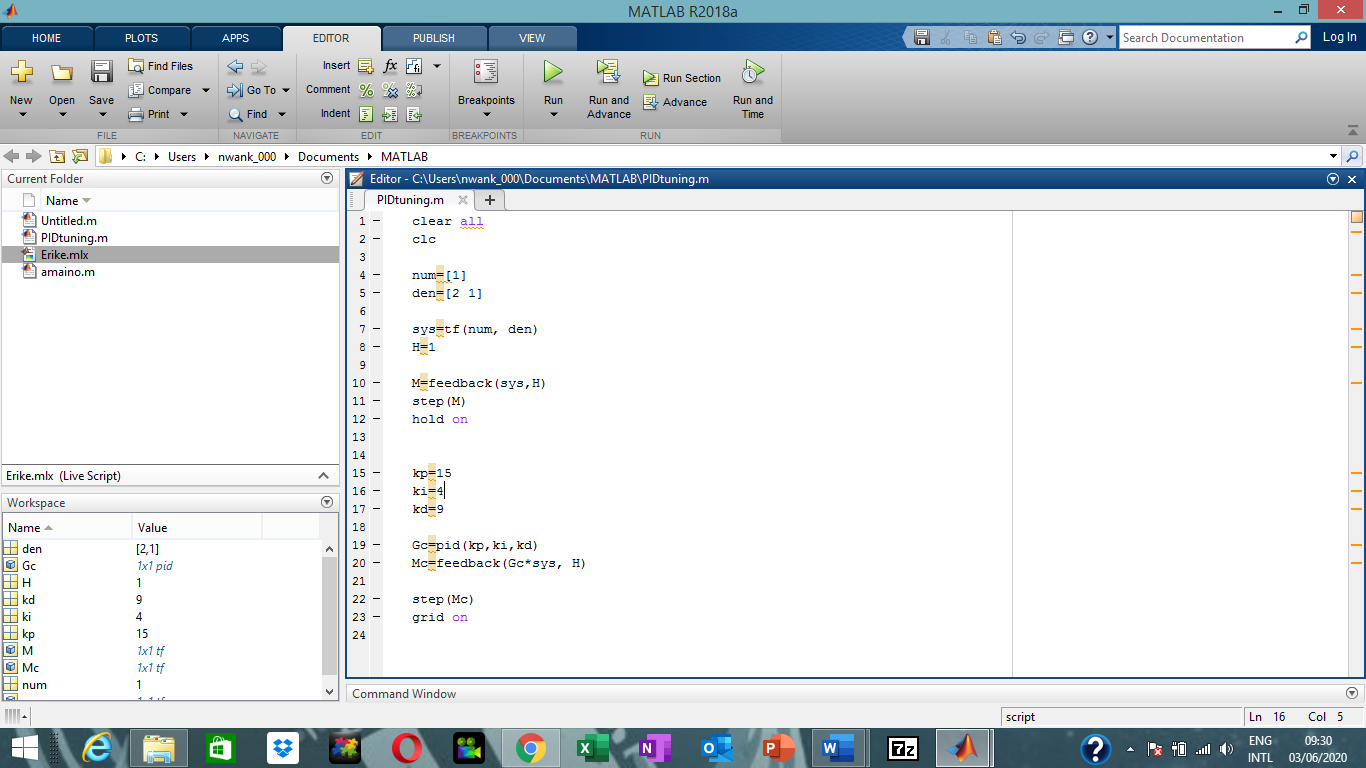
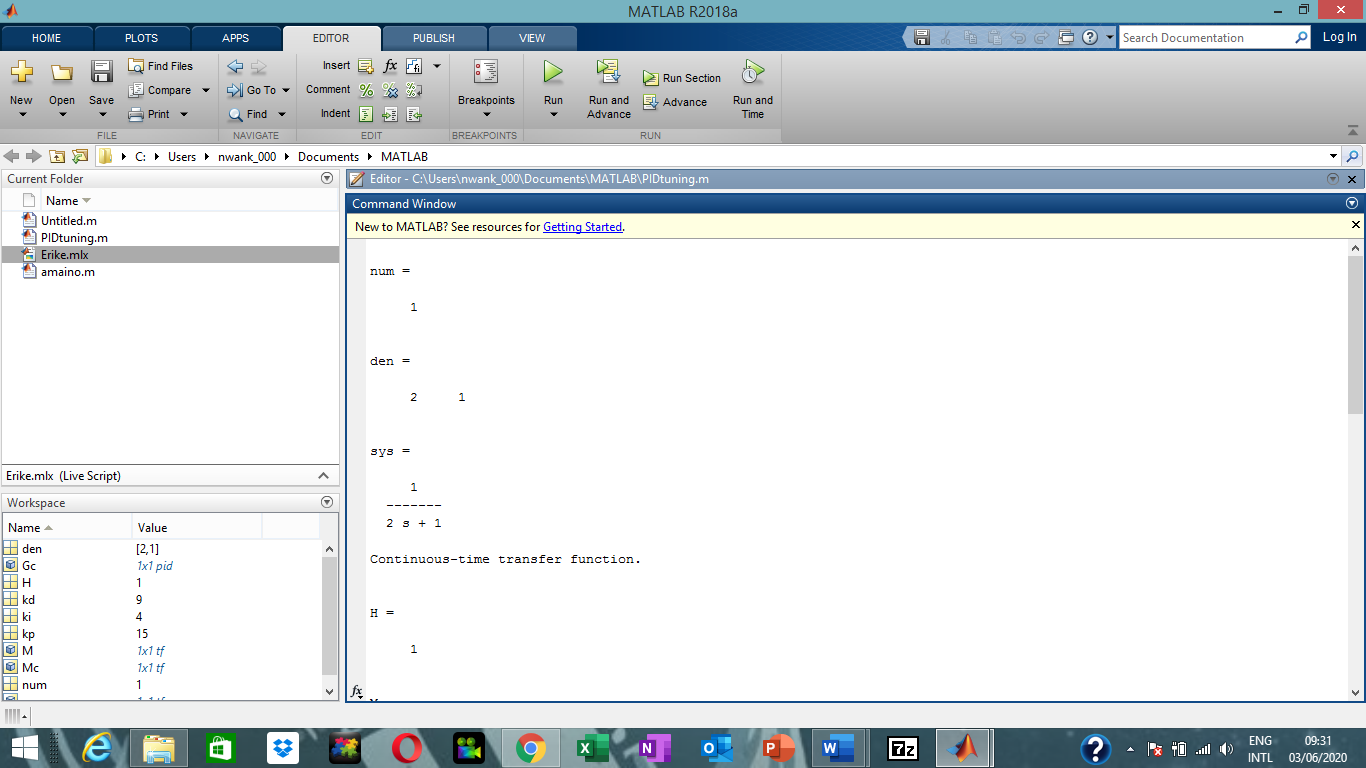
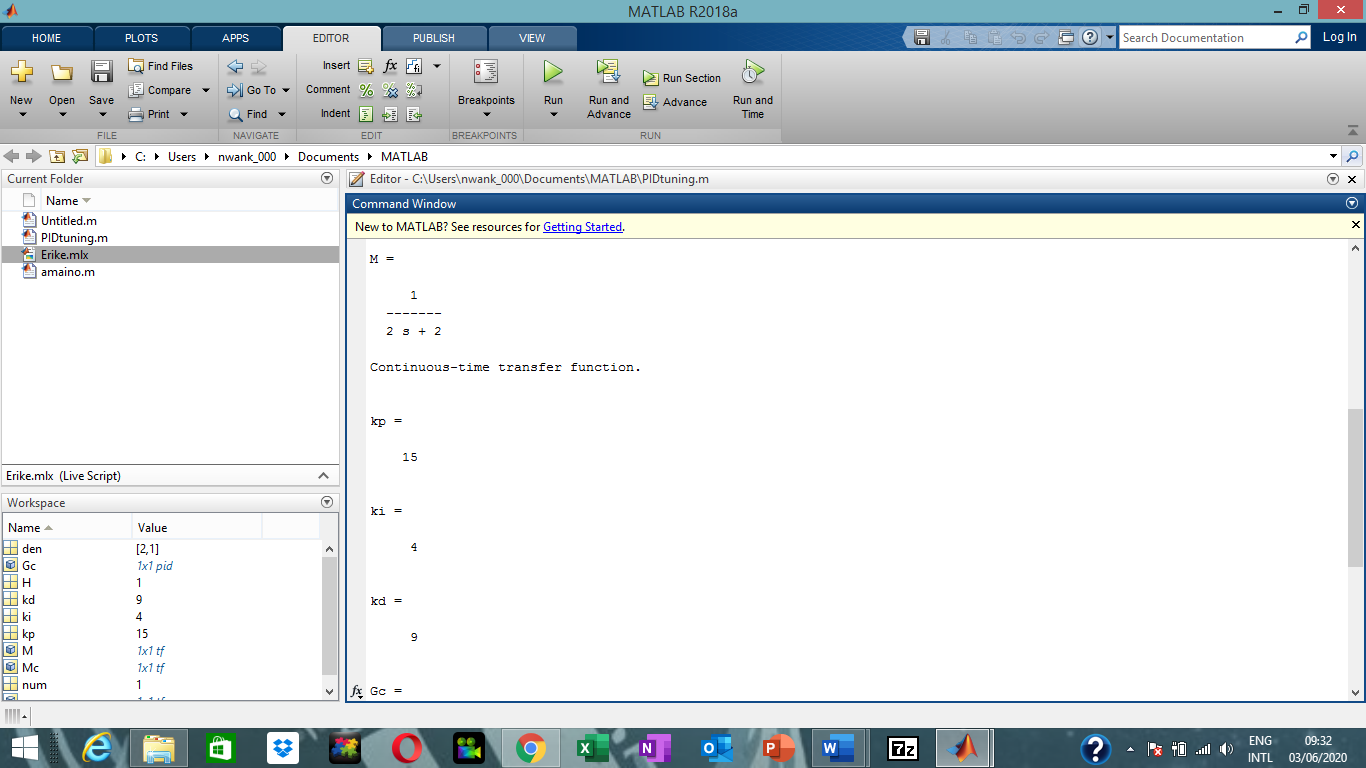
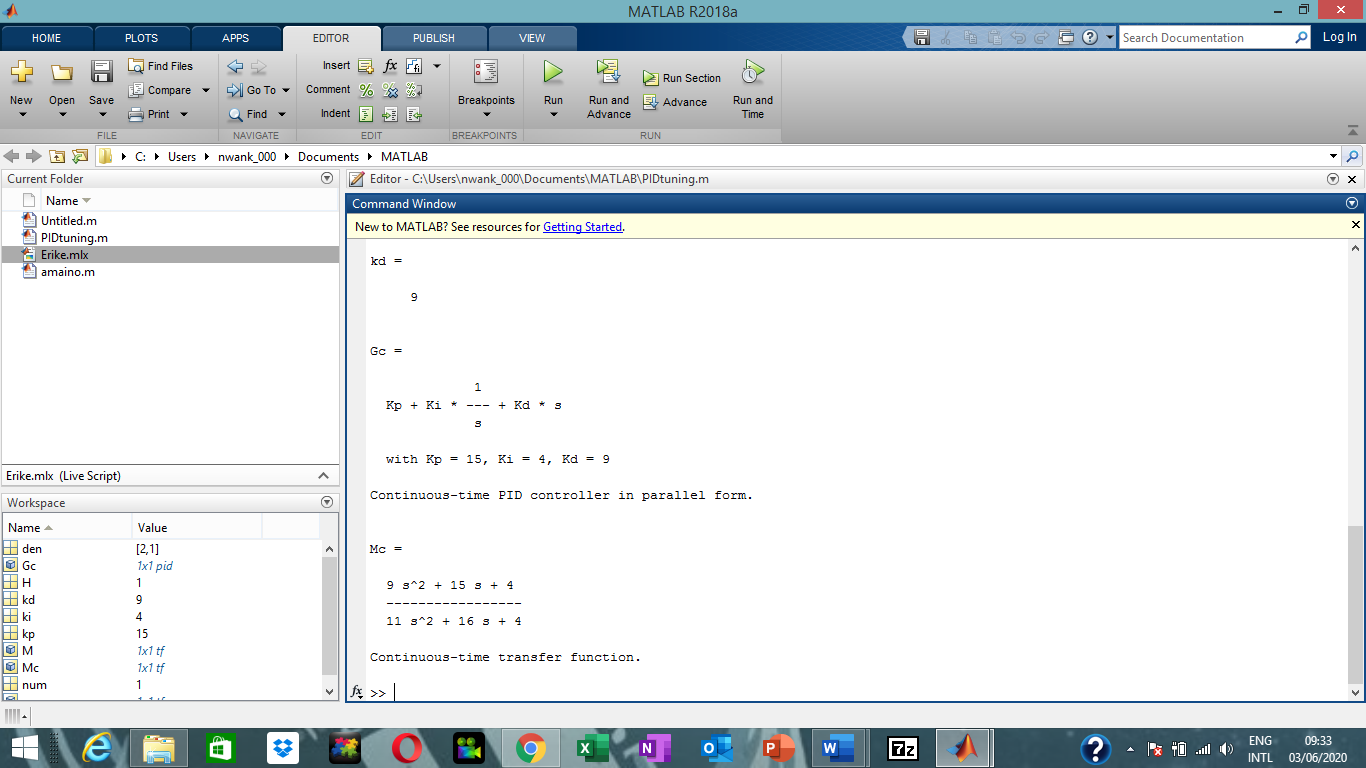
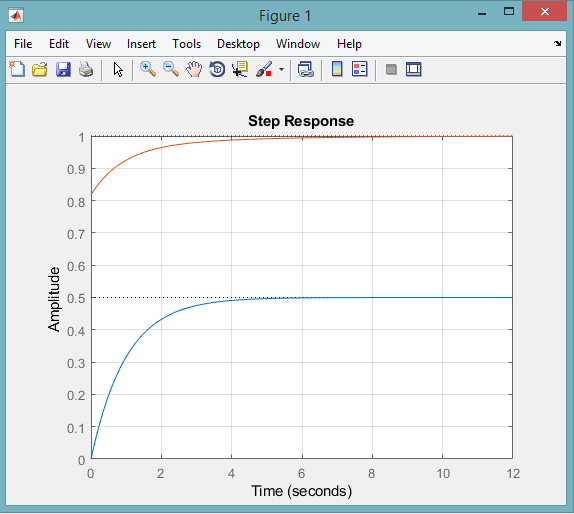
kd=9

Gc=pid(kp,ki,kd)

Mc=feedback(Gc\*sys, H)

step(Mc)

grid on

clear all

clc

num=[1];

den=[2 1];

sys=tf(num, den)

H=1;

M=feedback(sys,H)

step(M)

hold on

kp=30;

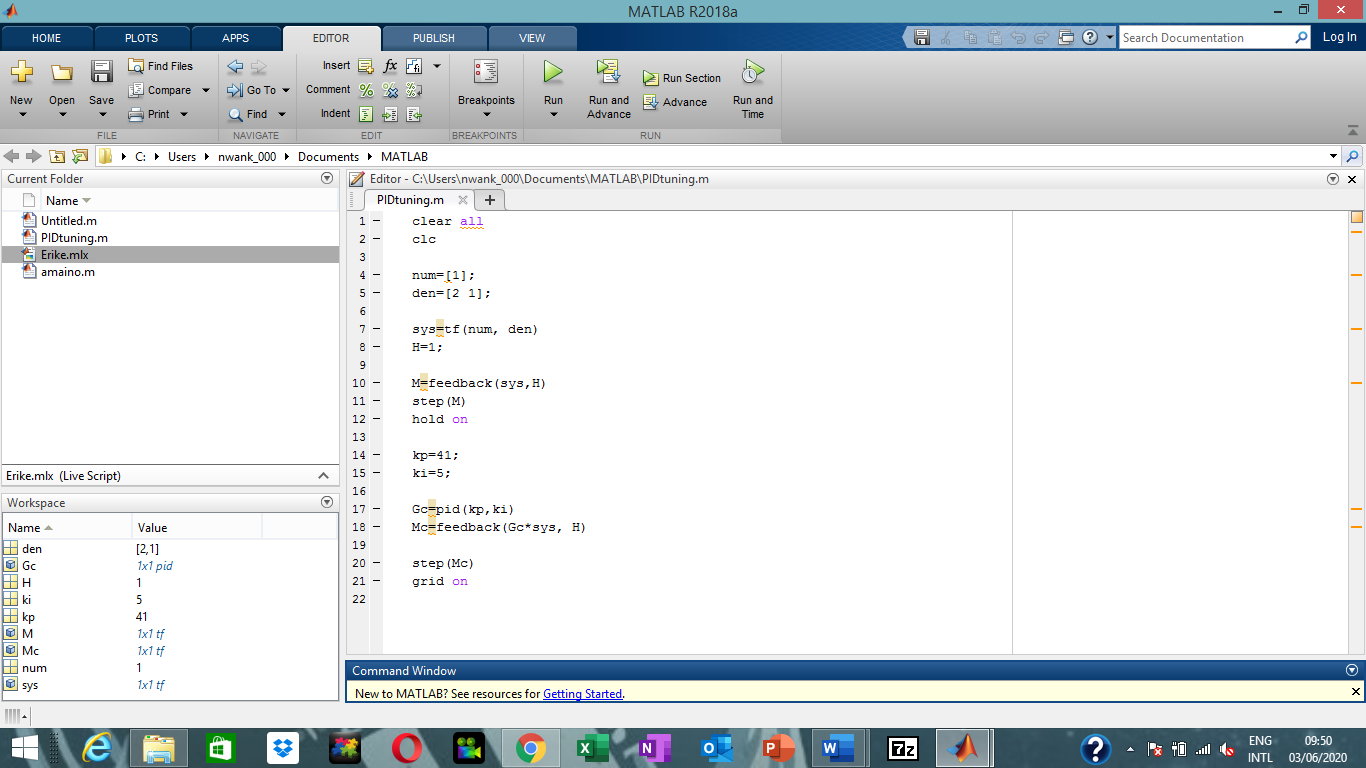
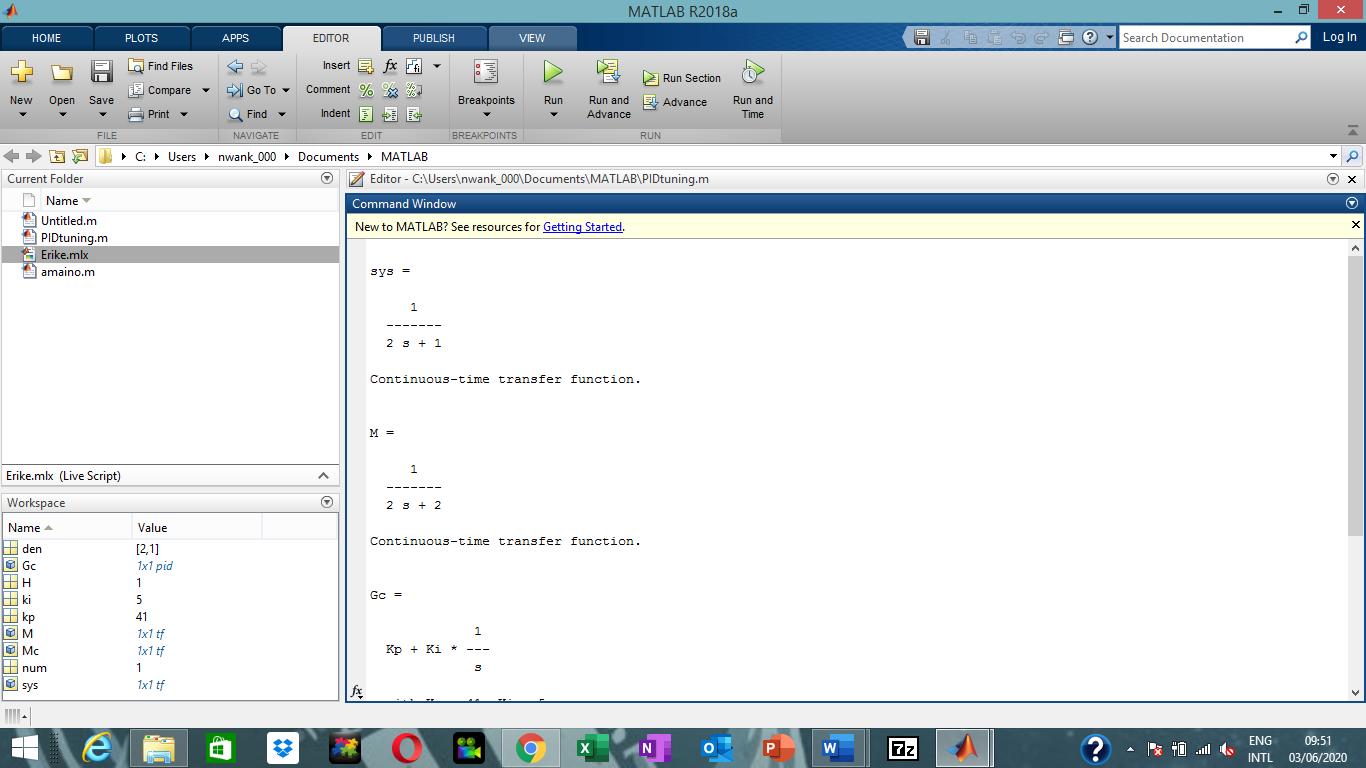
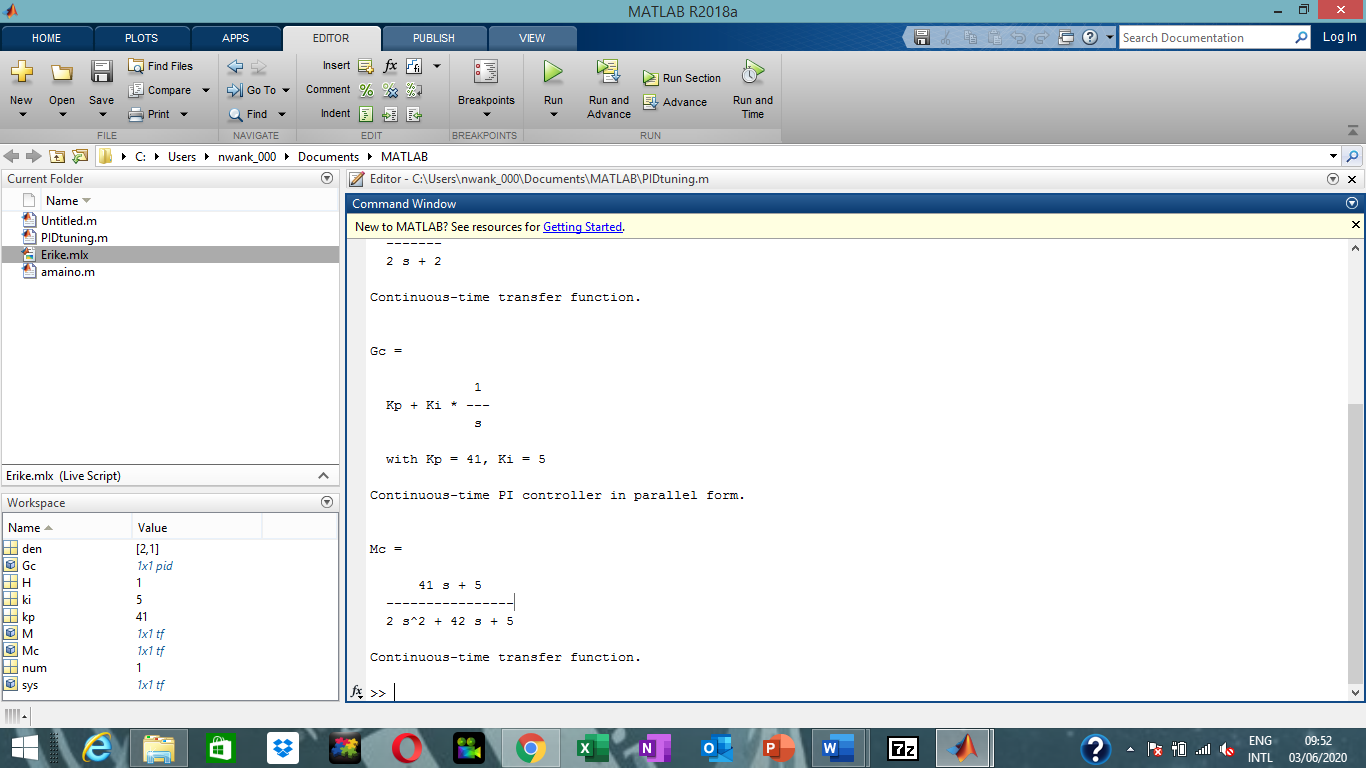
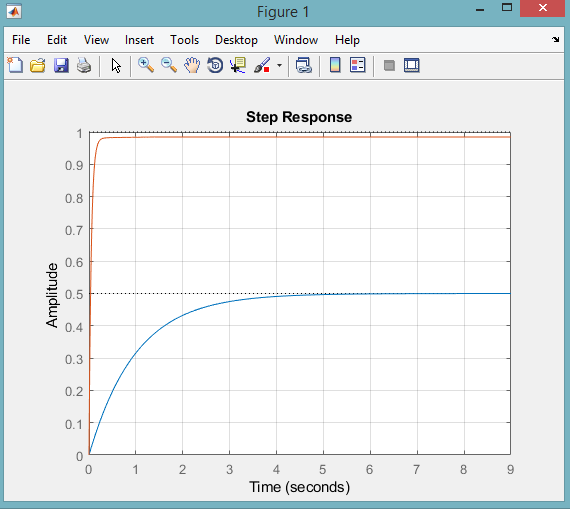
ki=2;

Gc=pid(kp,ki)

Mc=feedback(Gc\*sys, H)

step(Mc)

grid on

clear all

clc

num=[1];

den=[2 1];

sys=tf(num, den)

H=1;

M=feedback(sys,H)

step(M)

hold on

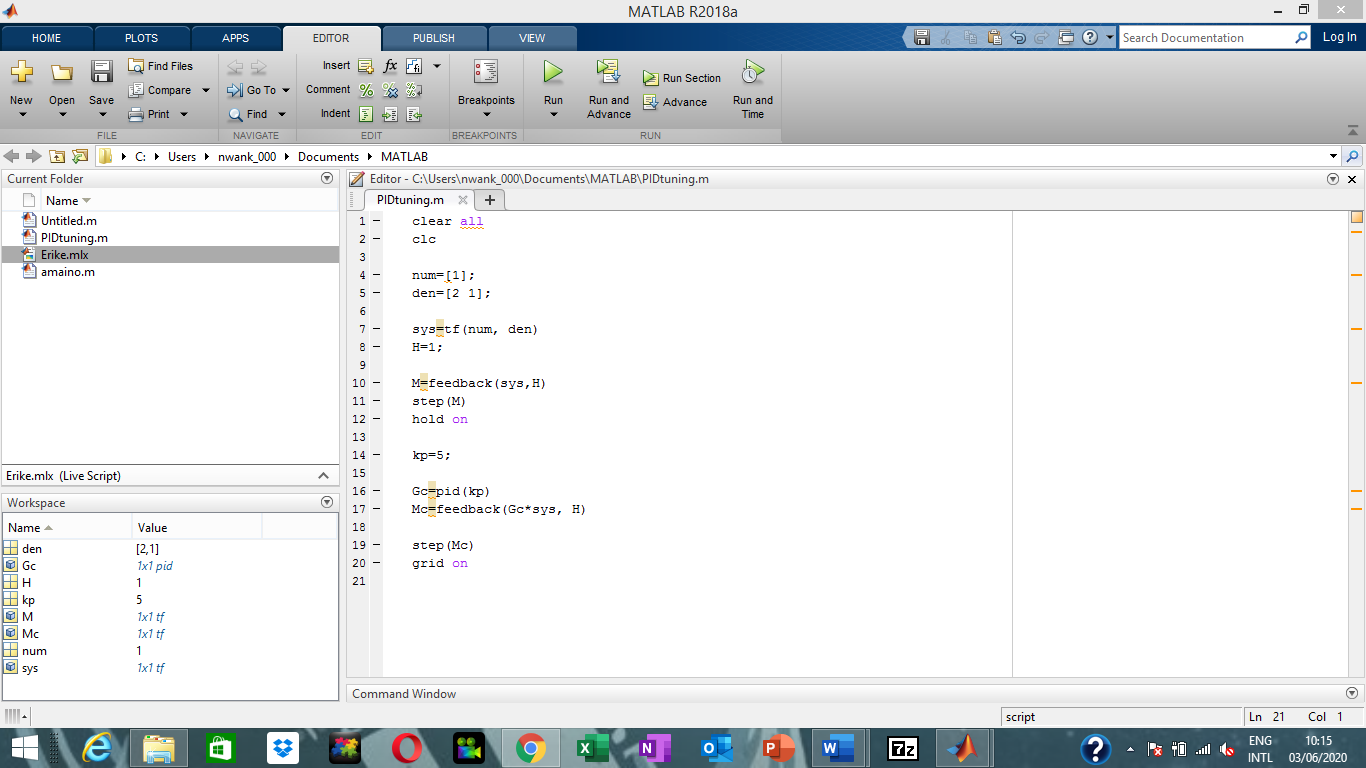
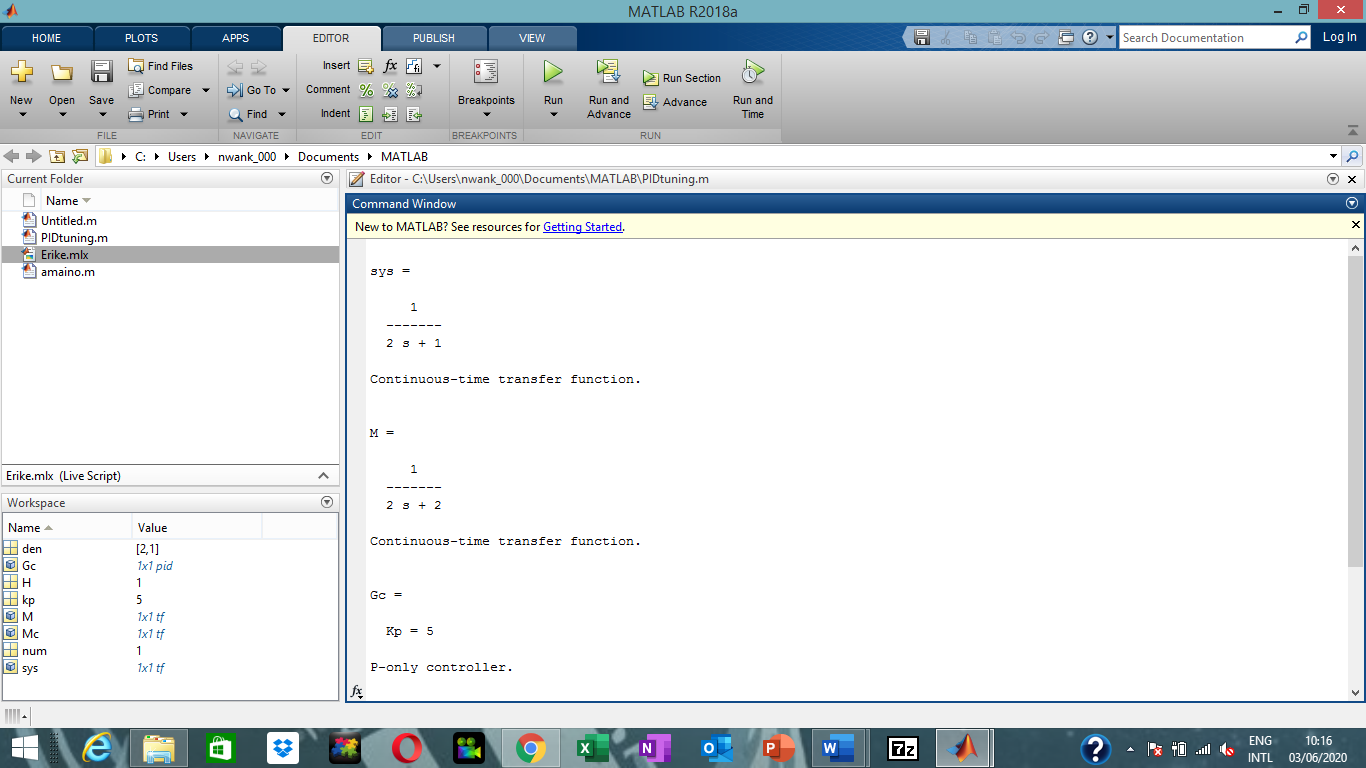
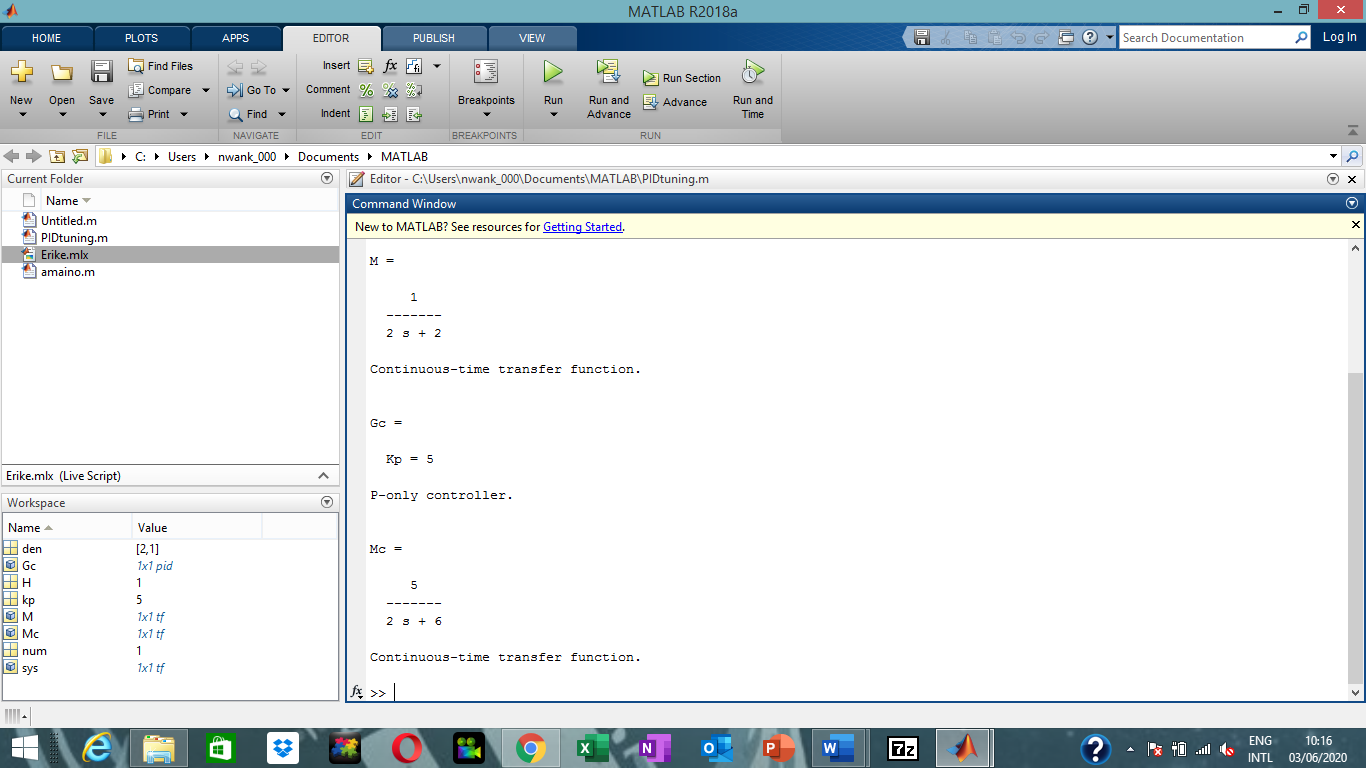
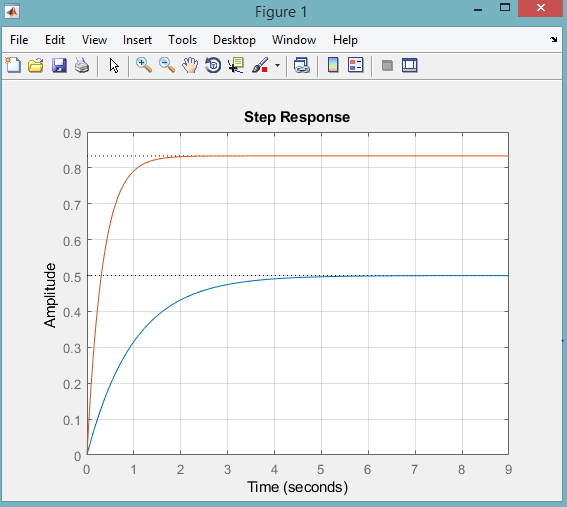
kp=5;

Gc=pid(kp)

Mc=feedback(Gc\*sys, H)

step(Mc)

grid on

clear all

clc

num=[2]

den=[1 12 9]

sys=tf(num, den)

H=1

M=feedback(sys,H)

step(M)

hold on

kp=10

ki=2

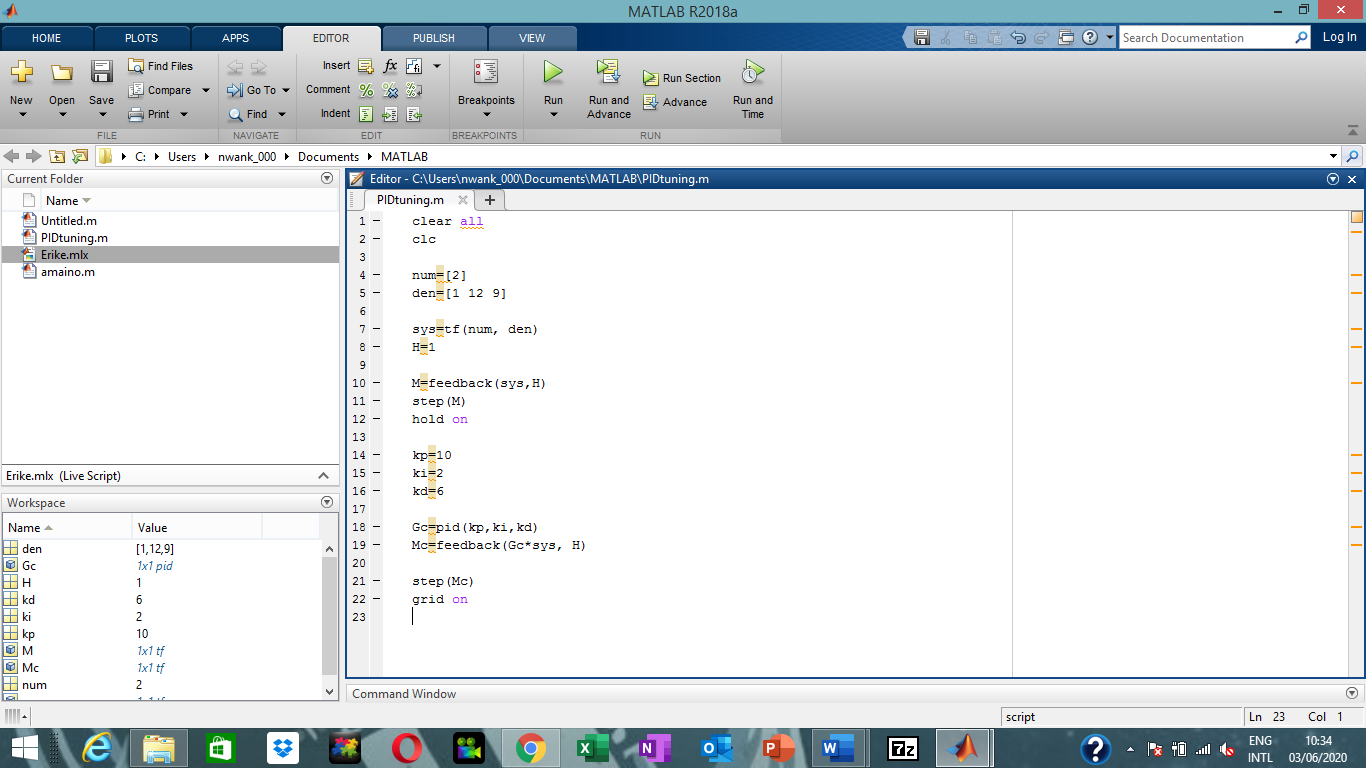
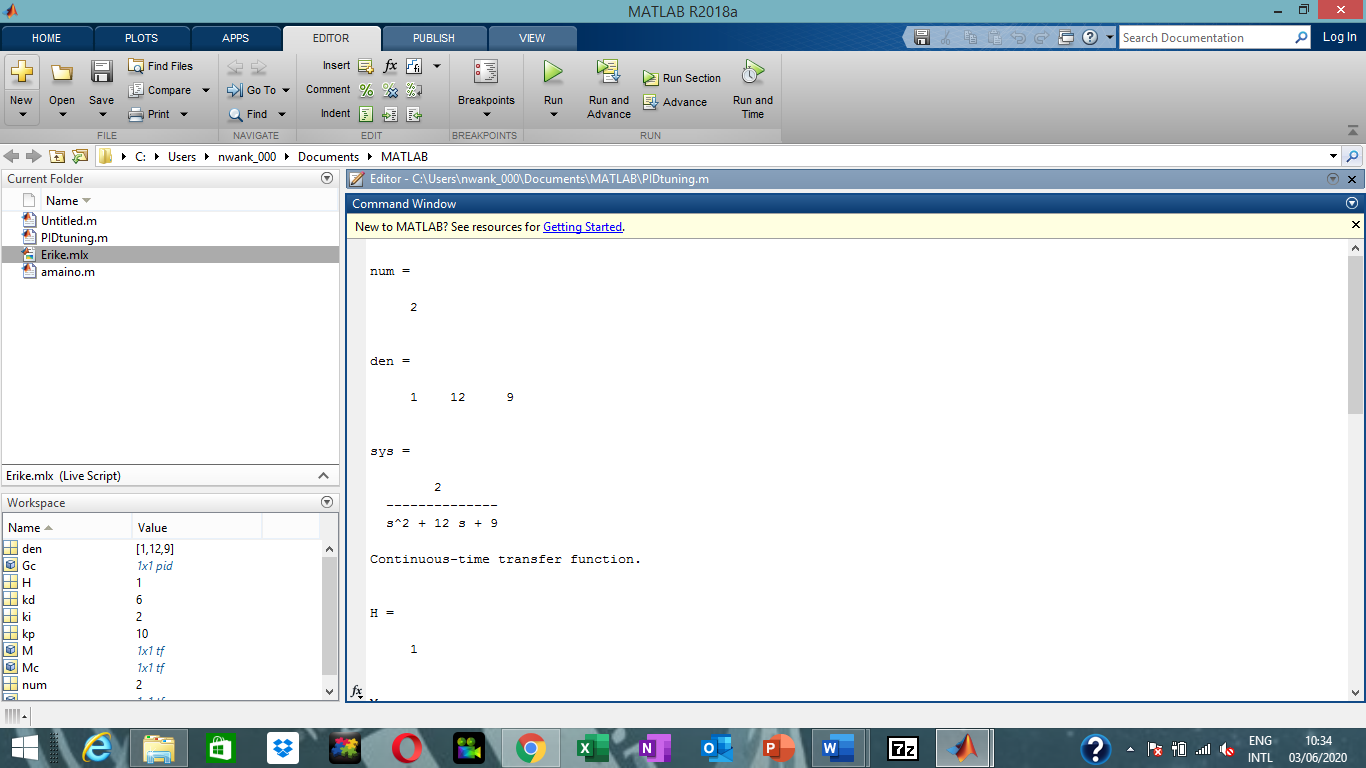
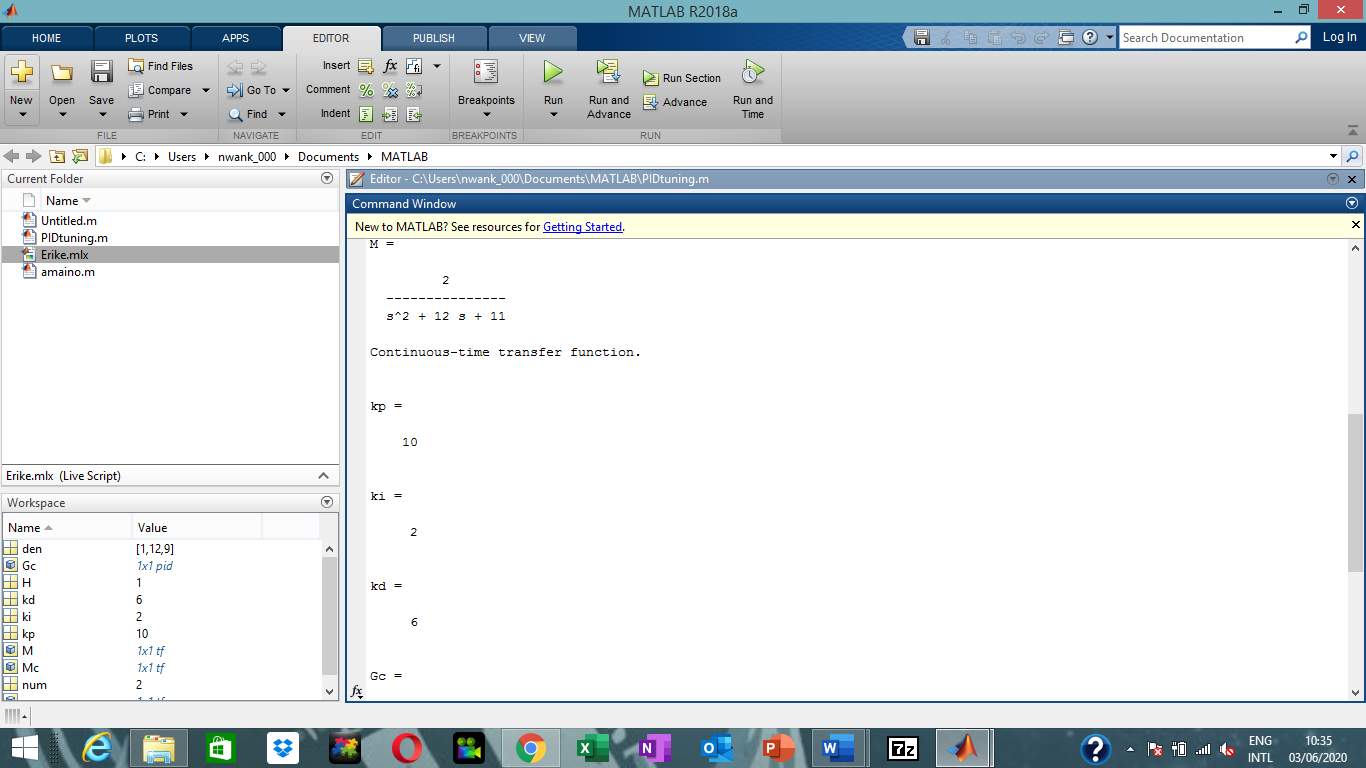
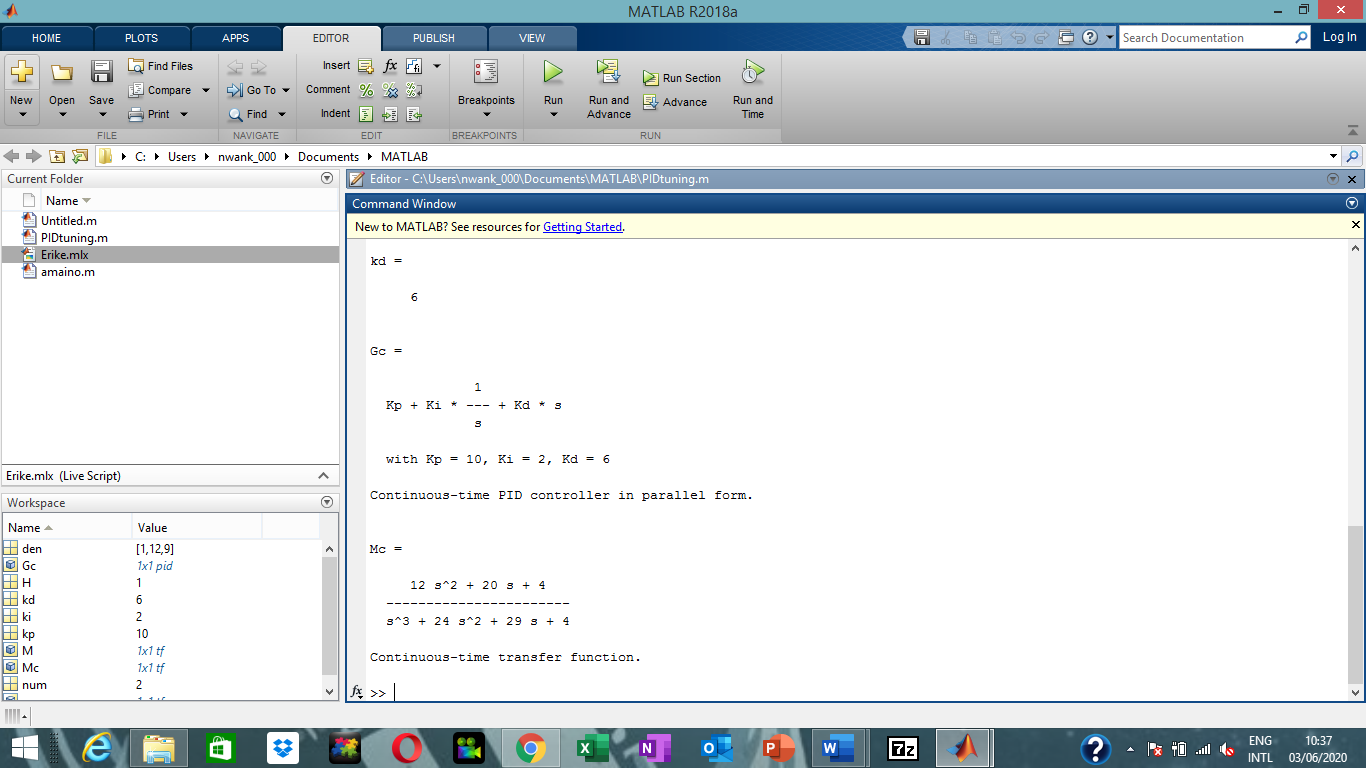
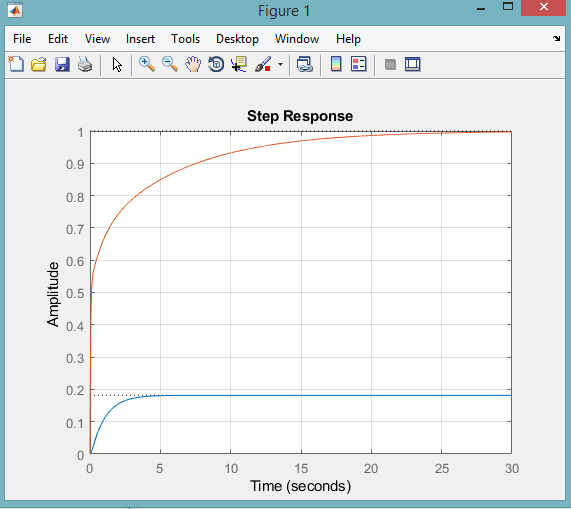
kd=6

Gc=pid(kp,ki,kd)

Mc=feedback(Gc\*sys, H)

step(Mc)

grid on

clear all

clc

num=[2]

den=[1 12 9]

sys=tf(num, den)

H=1

M=feedback(sys,H)

step(M)

hold on

kp=9

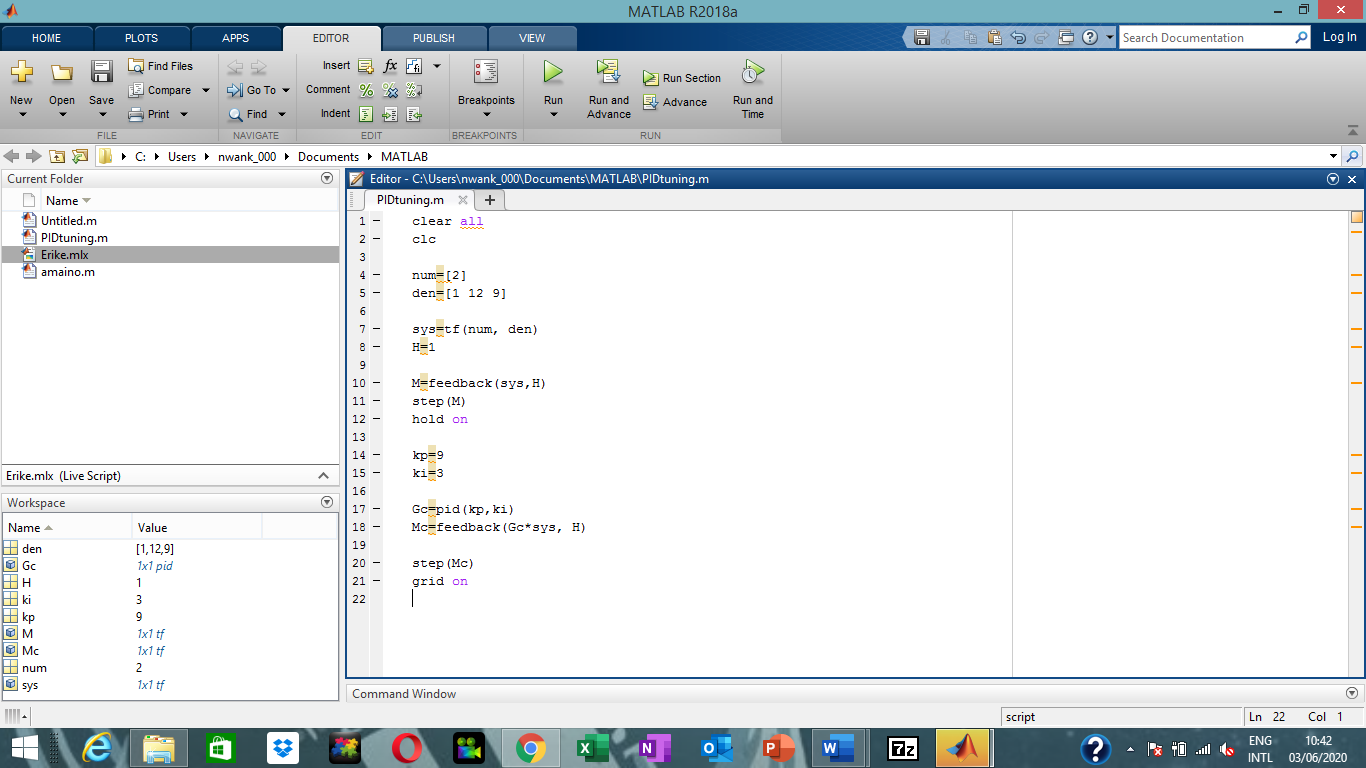
ki=3

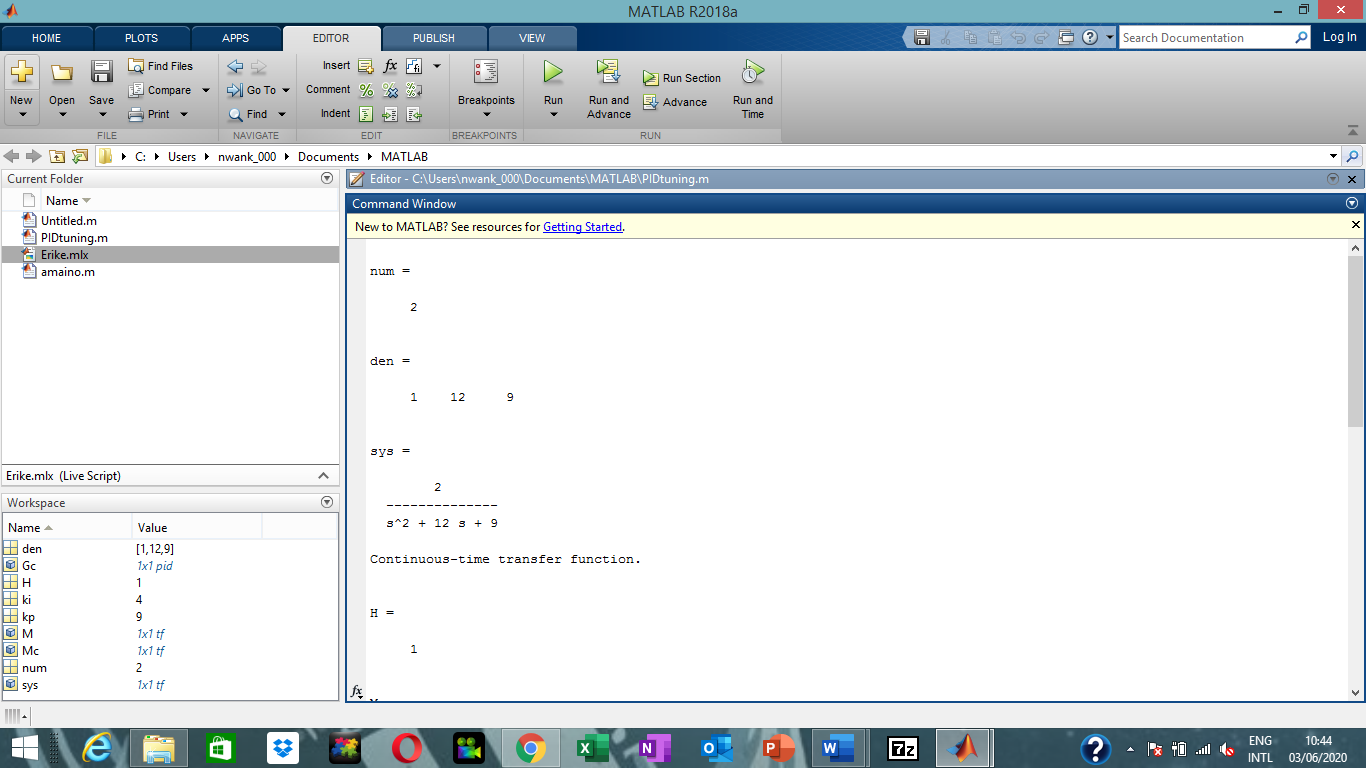
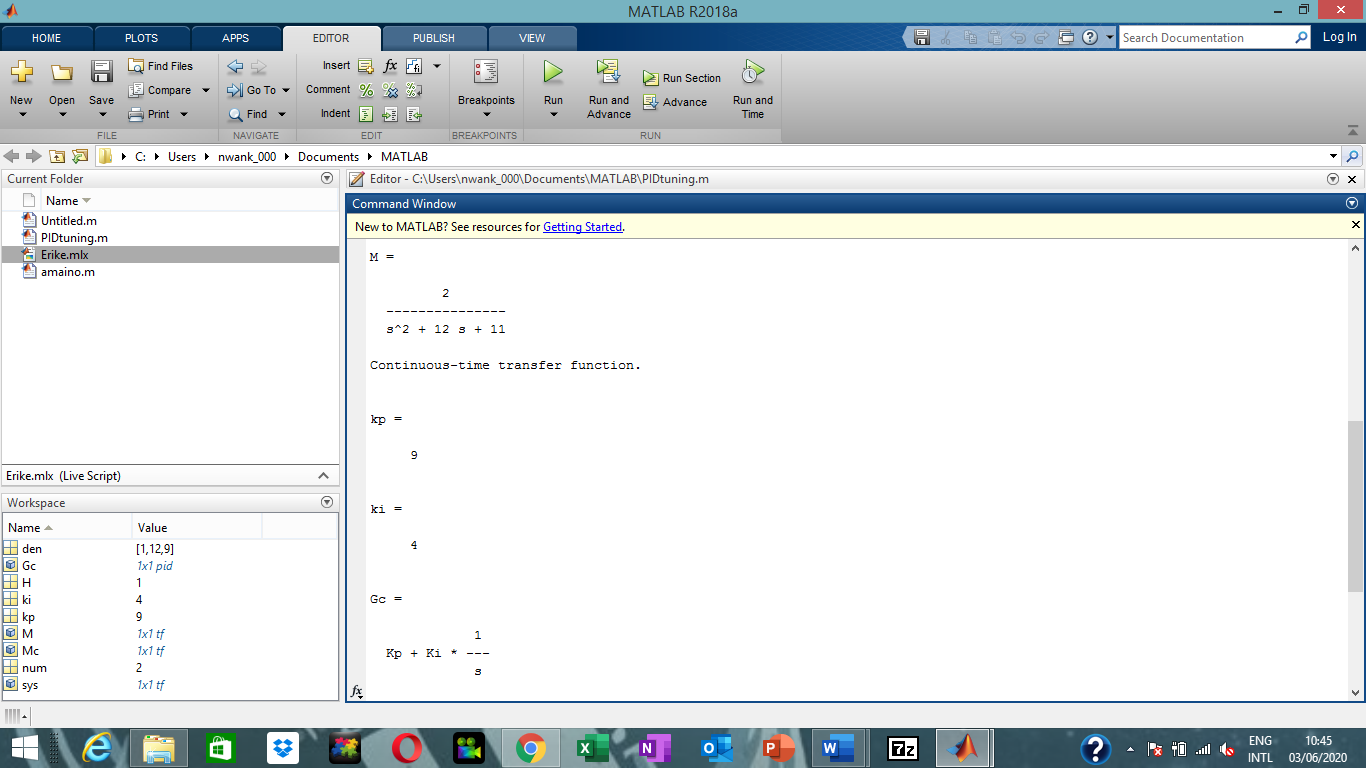
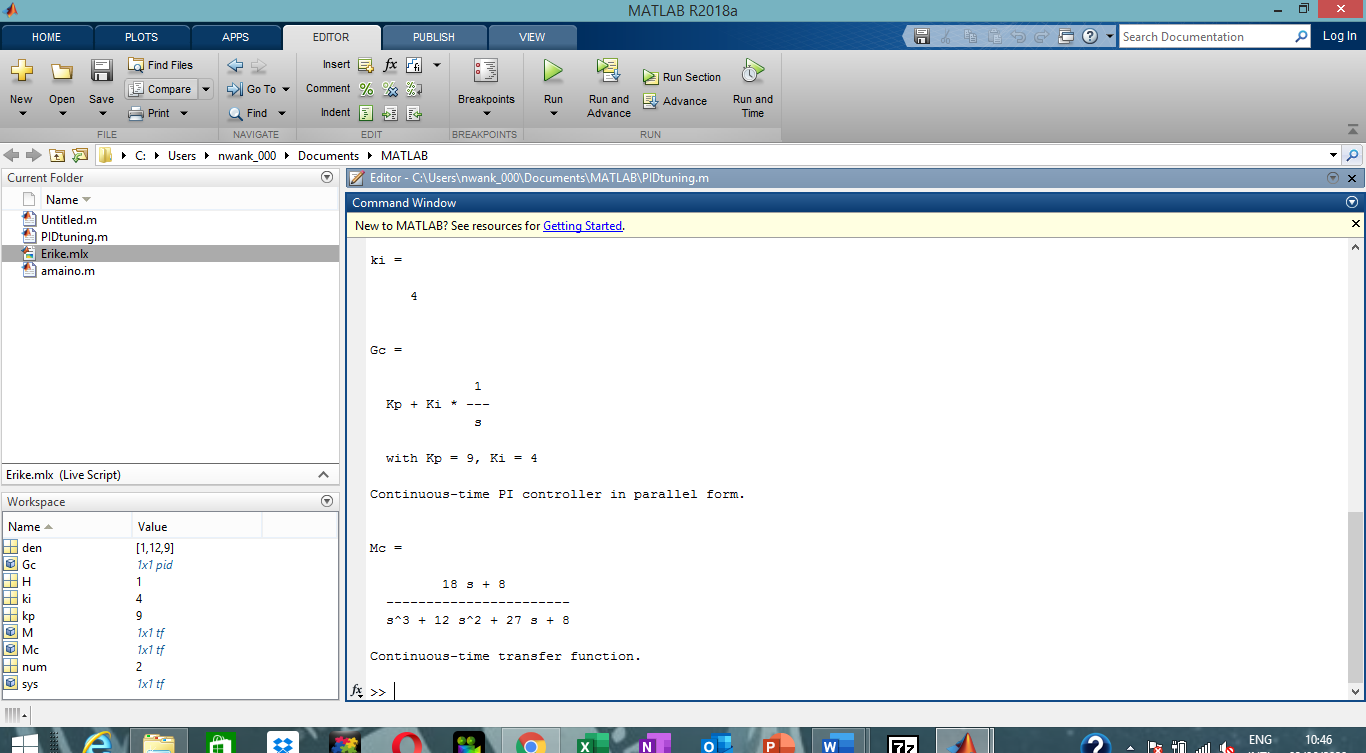
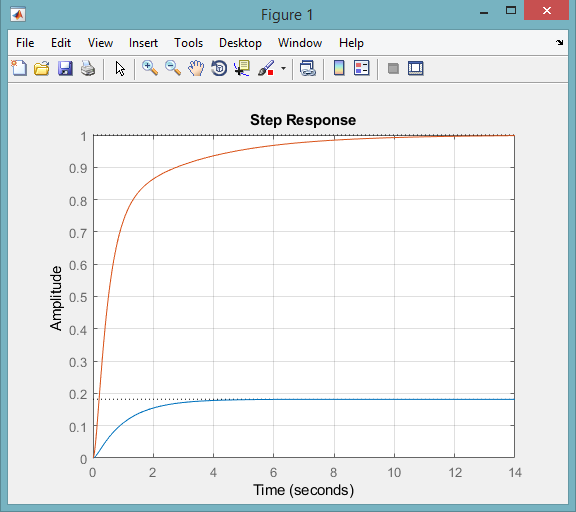
Gc=pid(kp,ki)

Mc=feedback(Gc\*sys, H)

step(Mc)

grid on



clear all

clc

num=[2]

den=[1 12 9]

sys=tf(num, den)

H=1

M=feedback(sys,H)

step(M)

hold on

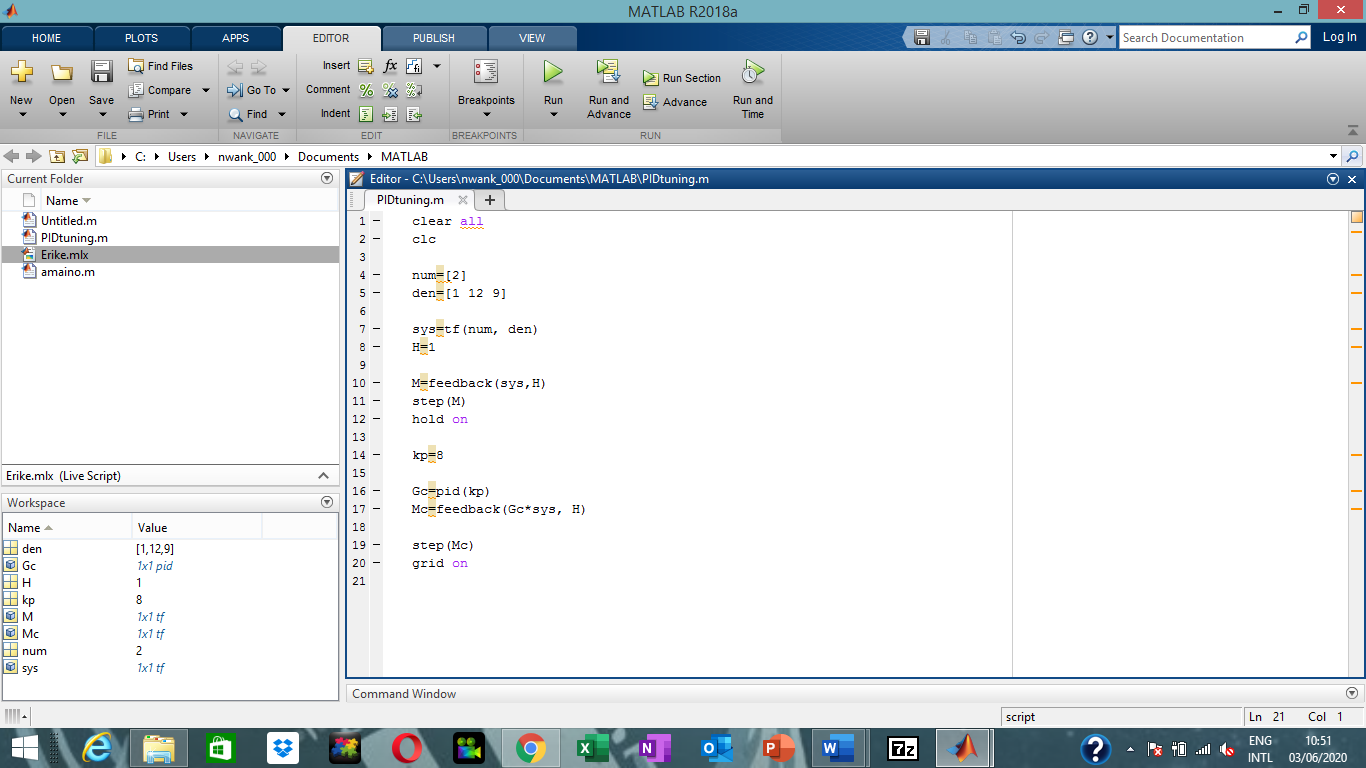
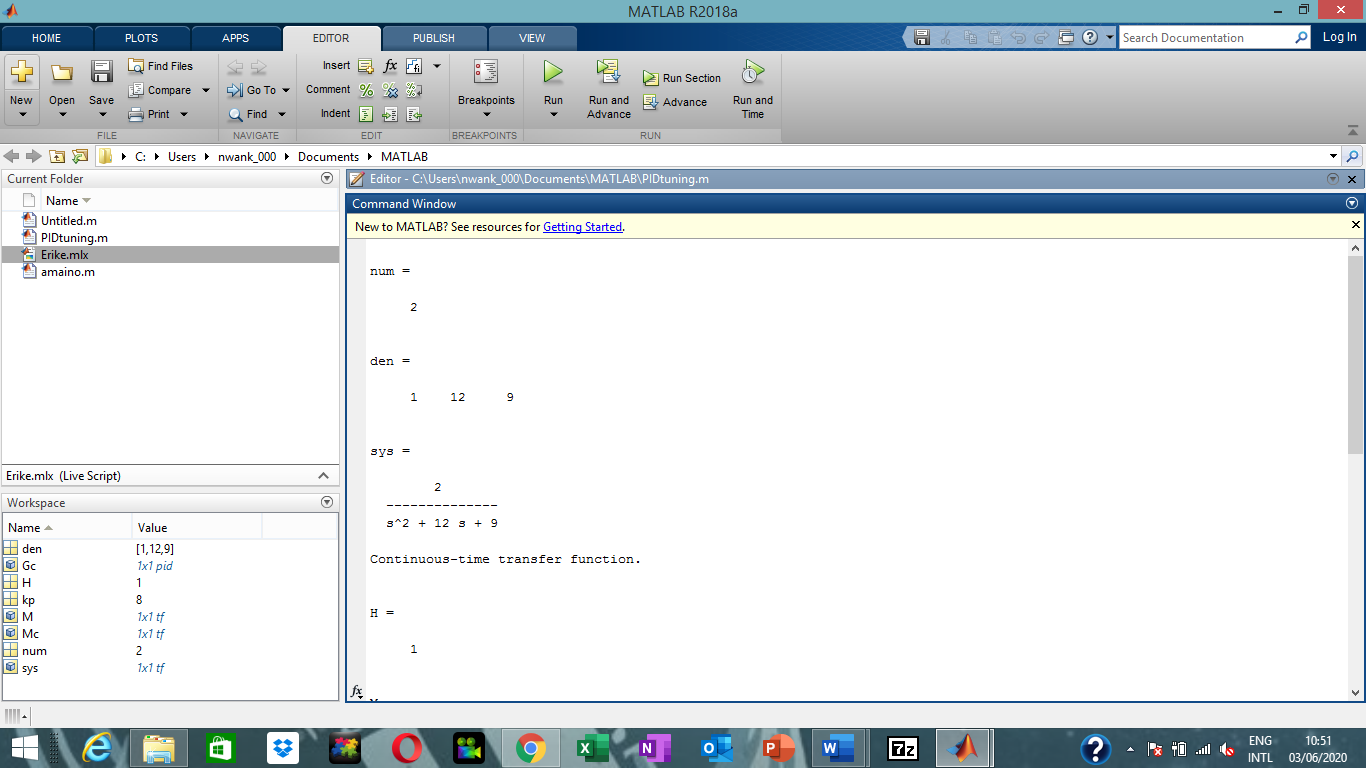
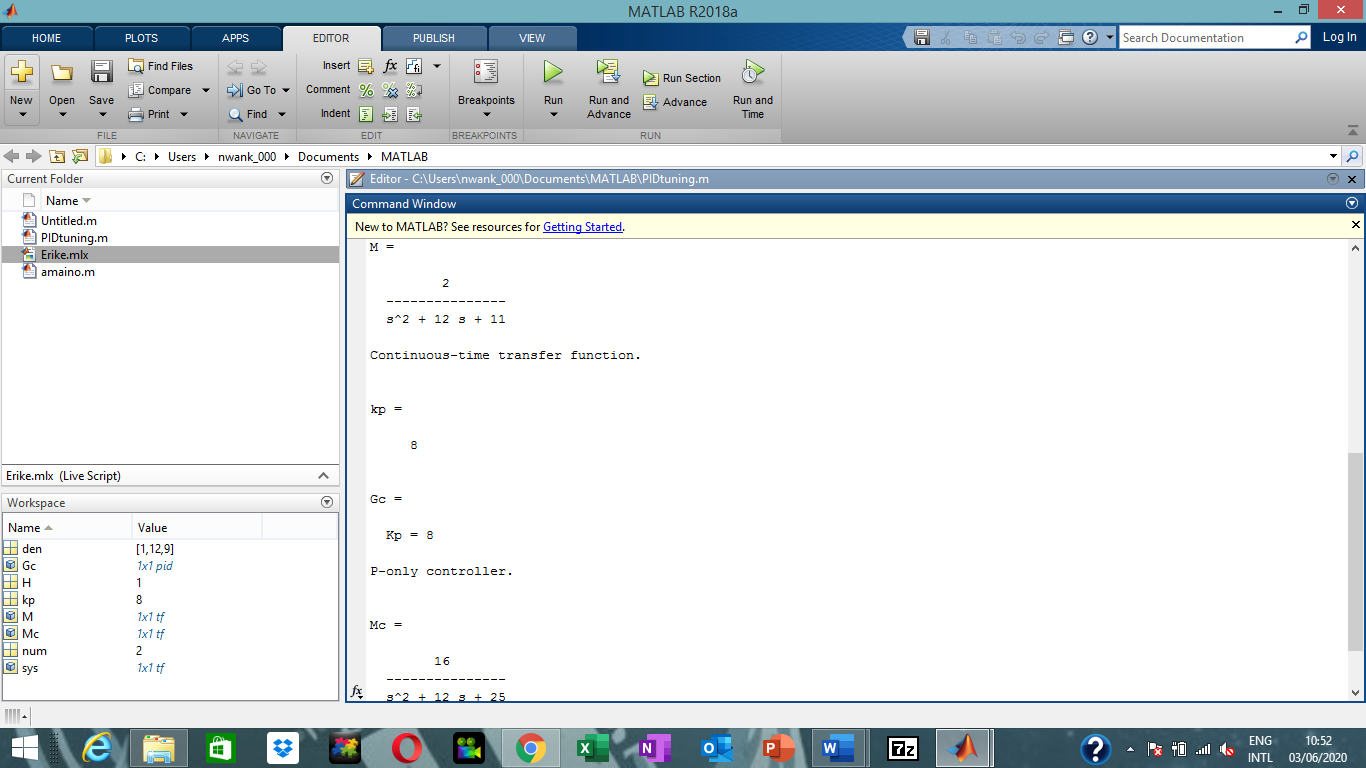
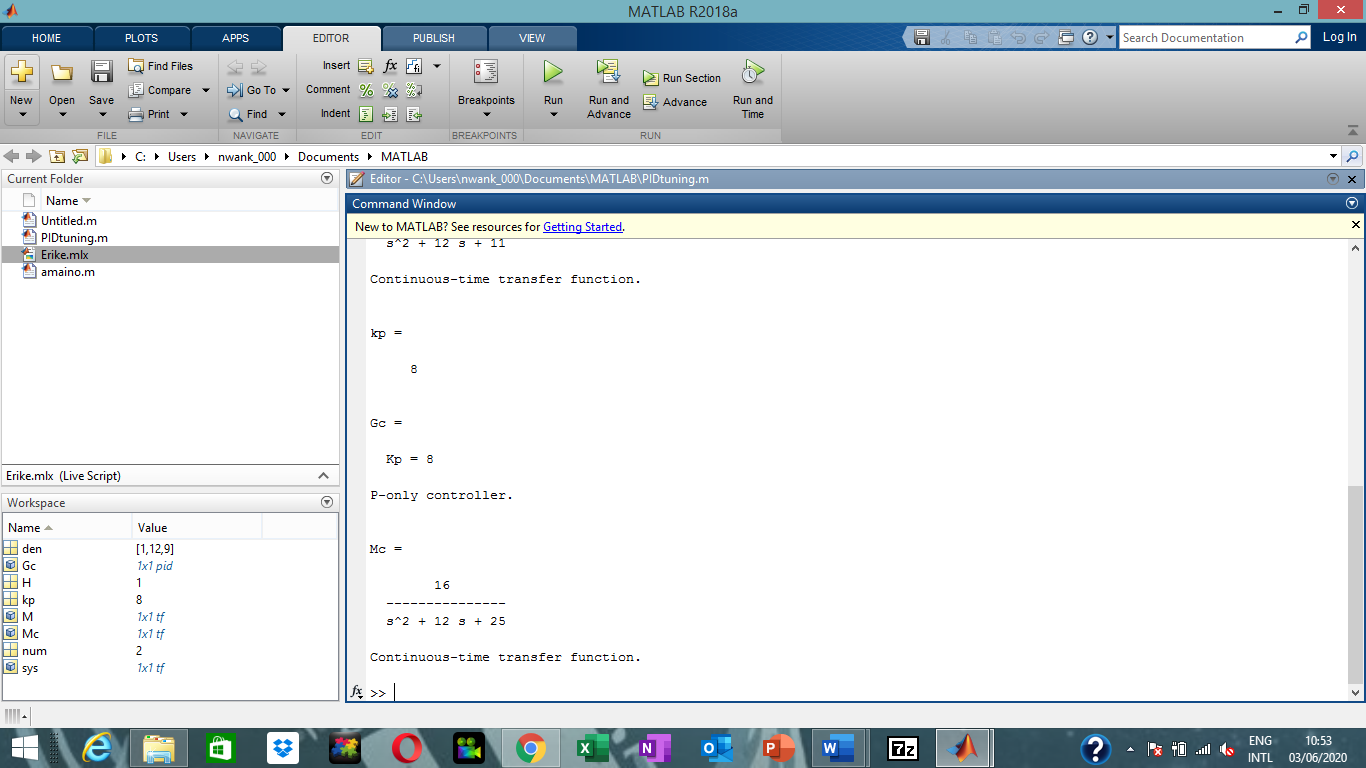
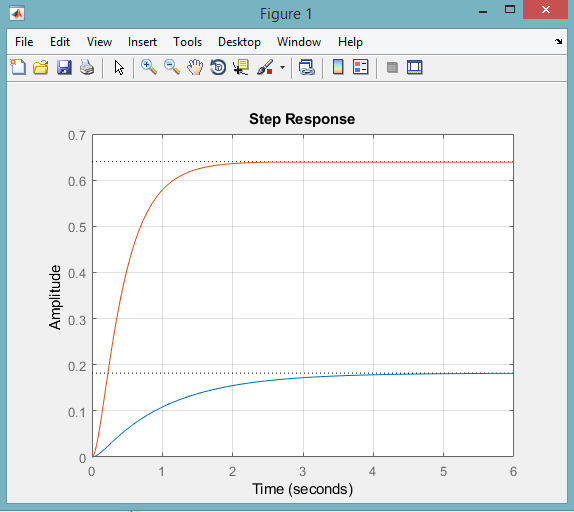
kp=8

Gc=pid(kp)

Mc=feedback(Gc\*sys, H)

step(Mc)

grid on

clear all

clc

num=[1]

den=[1 14 49]

sys=tf(num, den)

H=1

M=feedback(sys,H)

step(M)

hold on

kp=8

ki=0

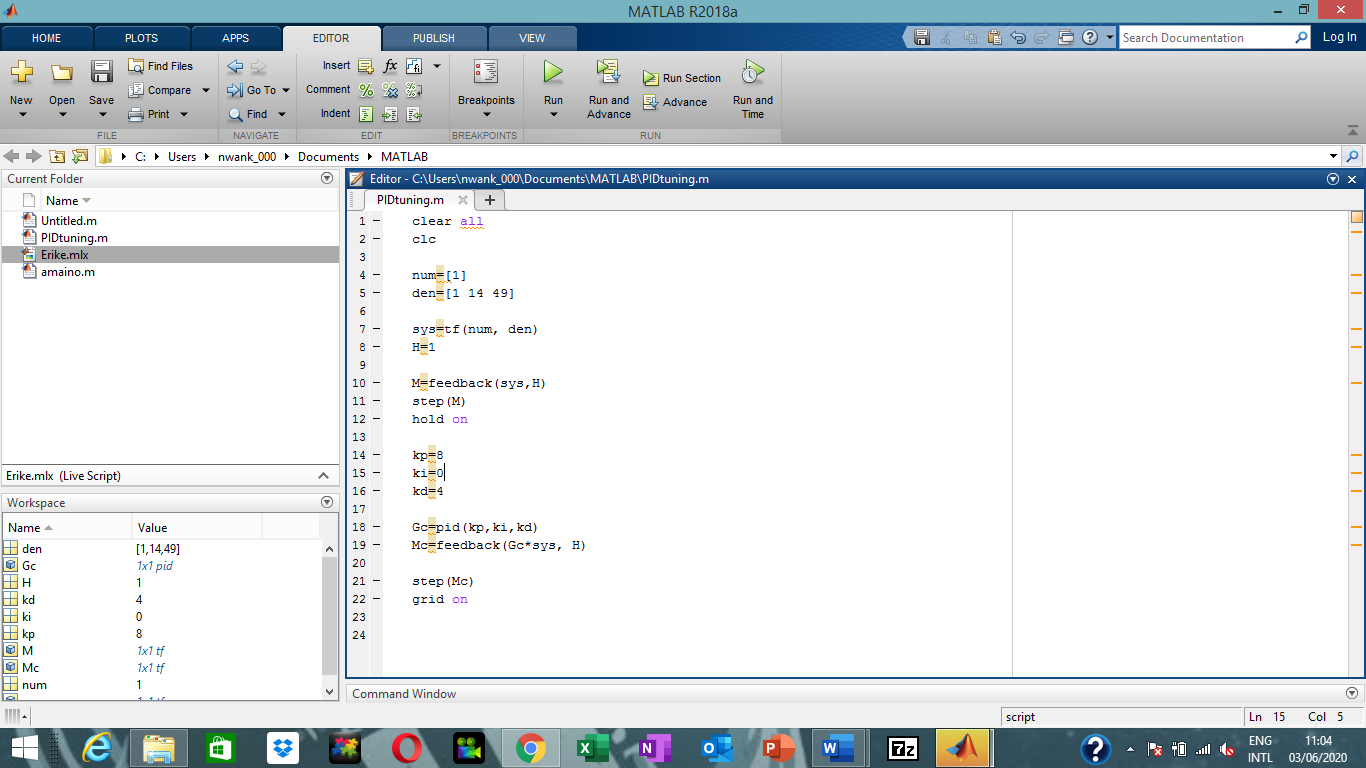
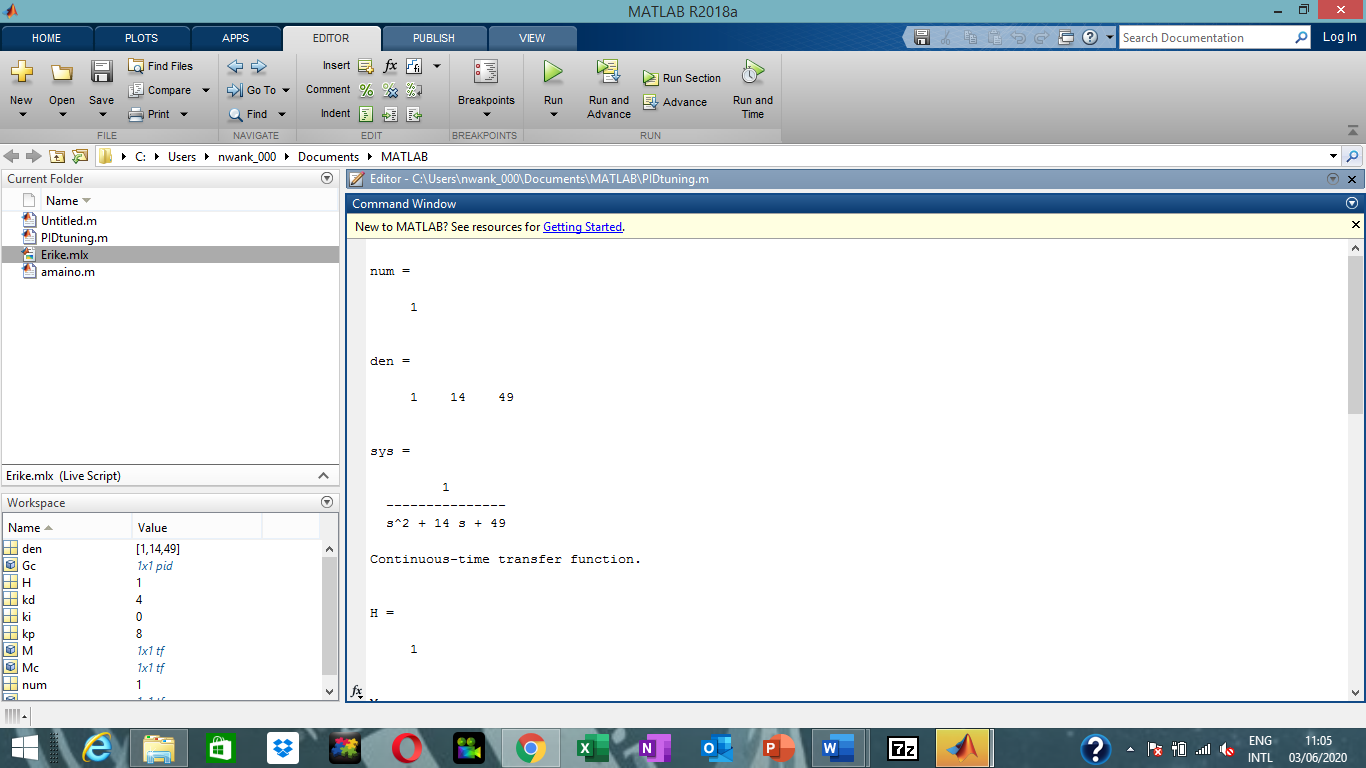
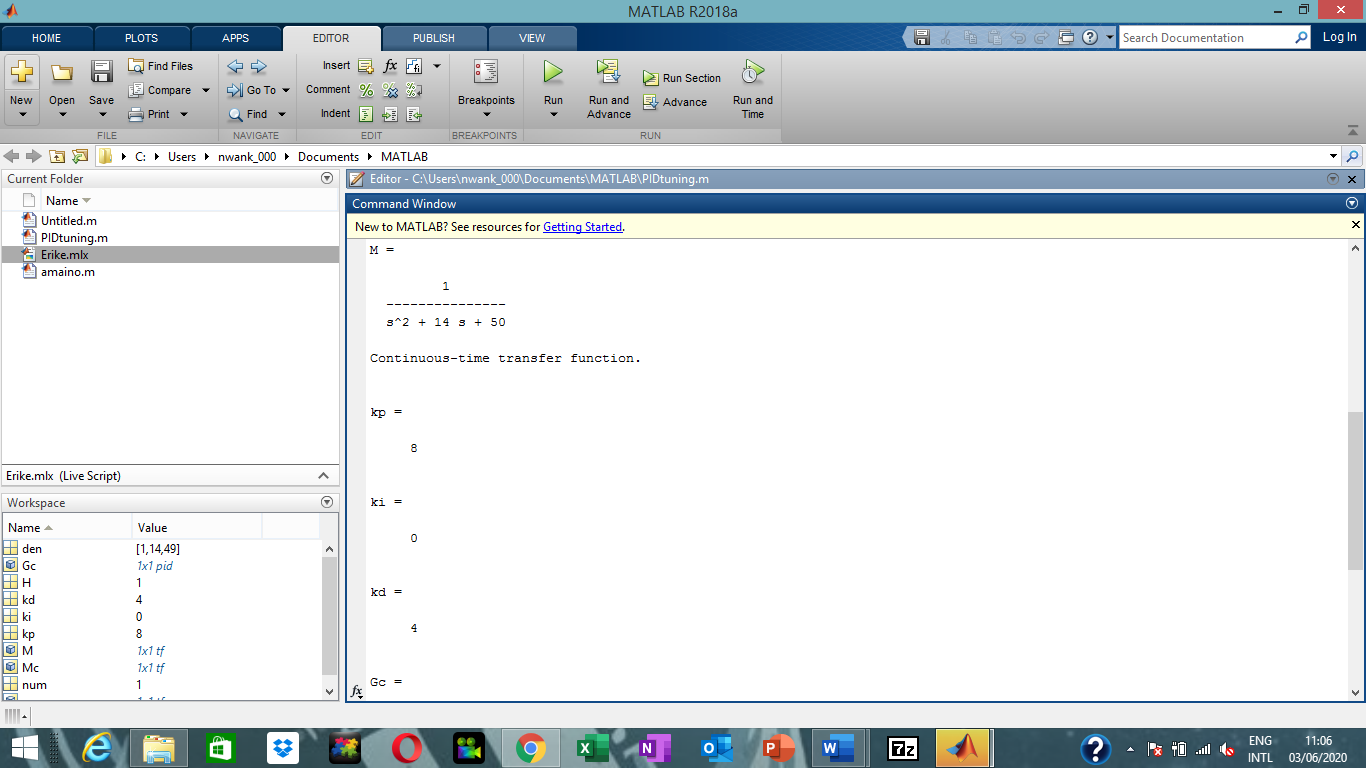
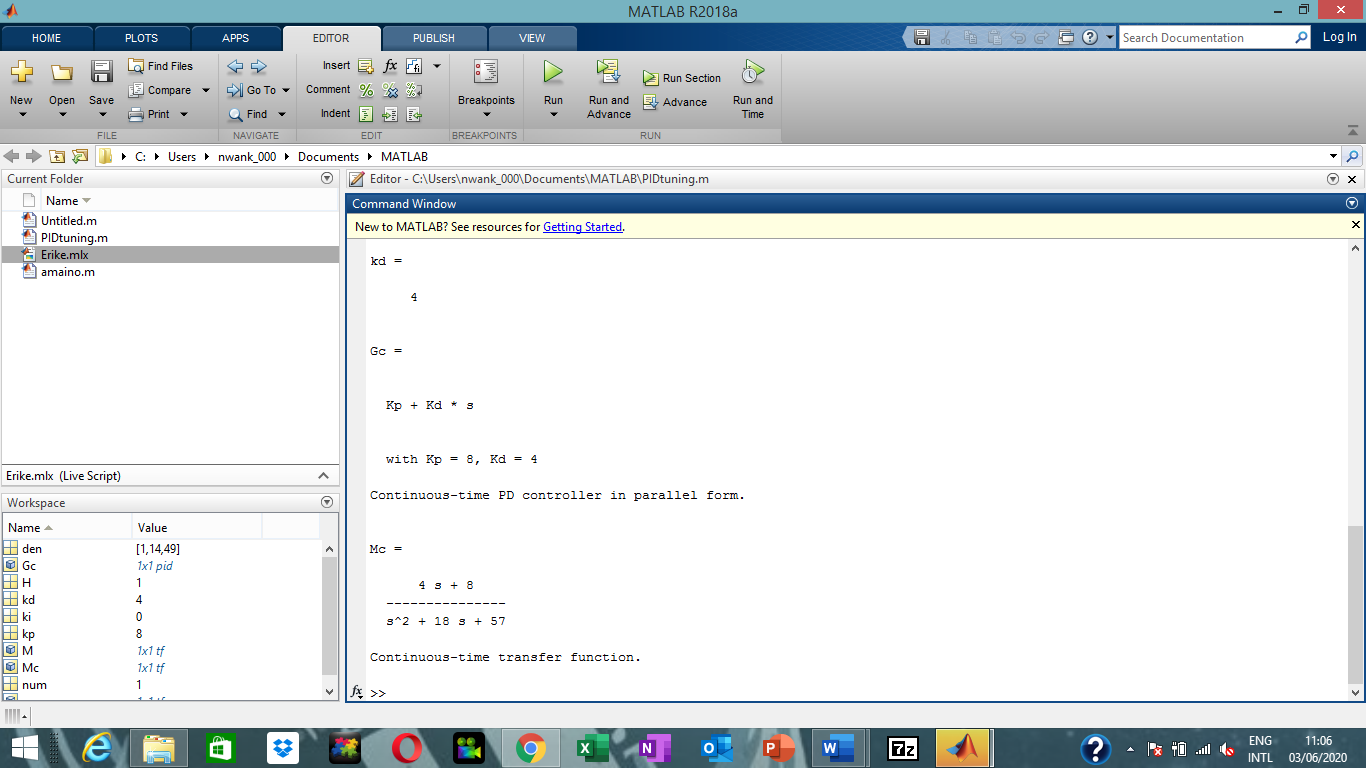
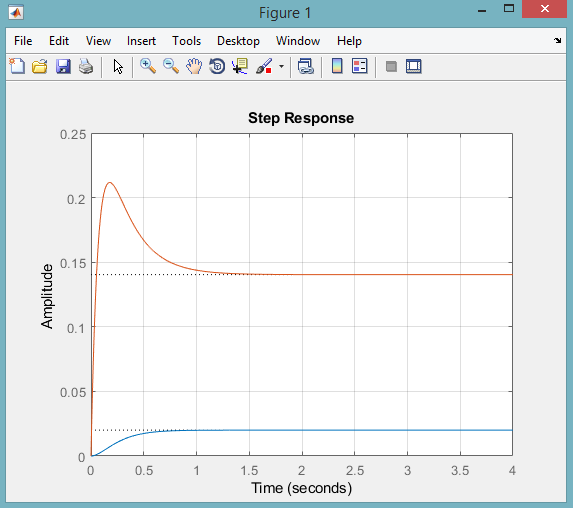
kd=4

Gc=pid(kp,ki,kd)

Mc=feedback(Gc\*sys, H)

step(Mc)

grid on

clear all

clc

num=[1]

den=[1 14 49]

sys=tf(num, den)

H=1

M=feedback(sys,H)

step(M)

hold on

kp=6

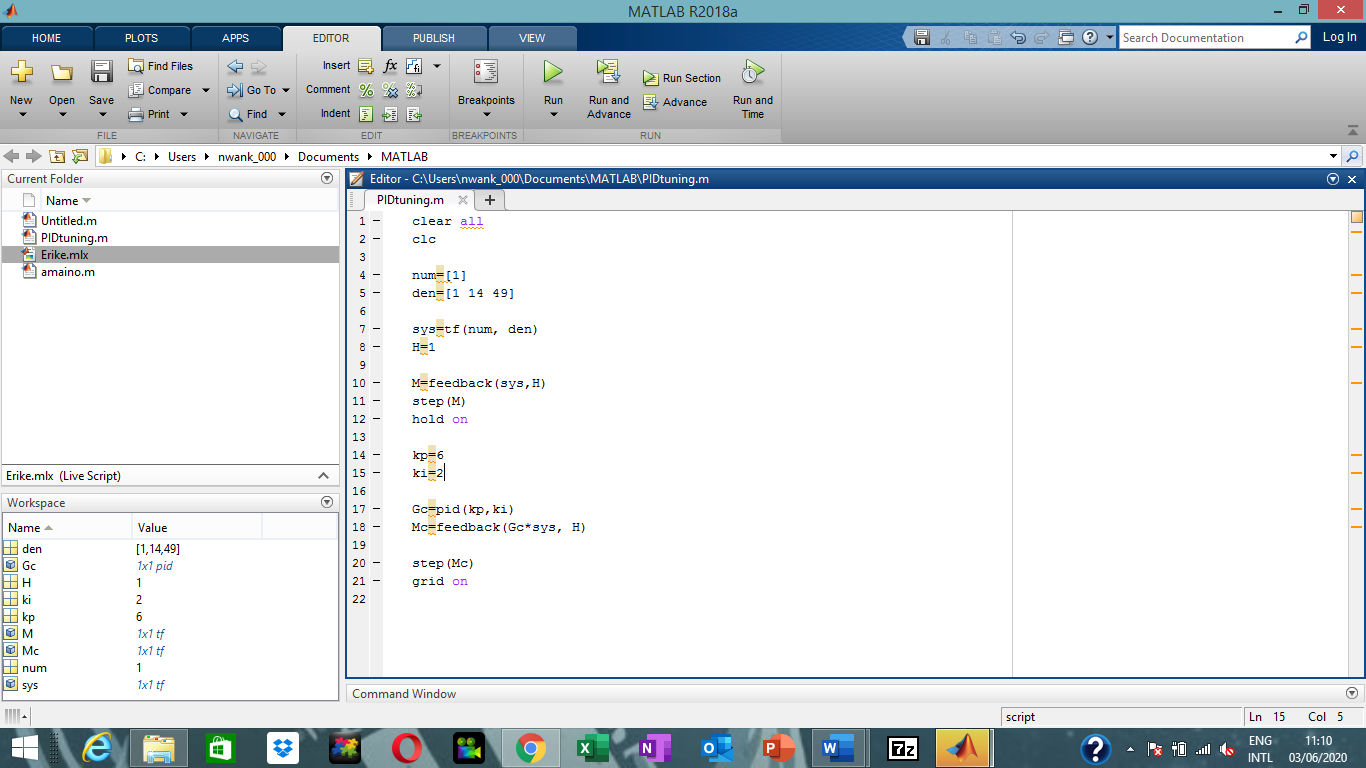
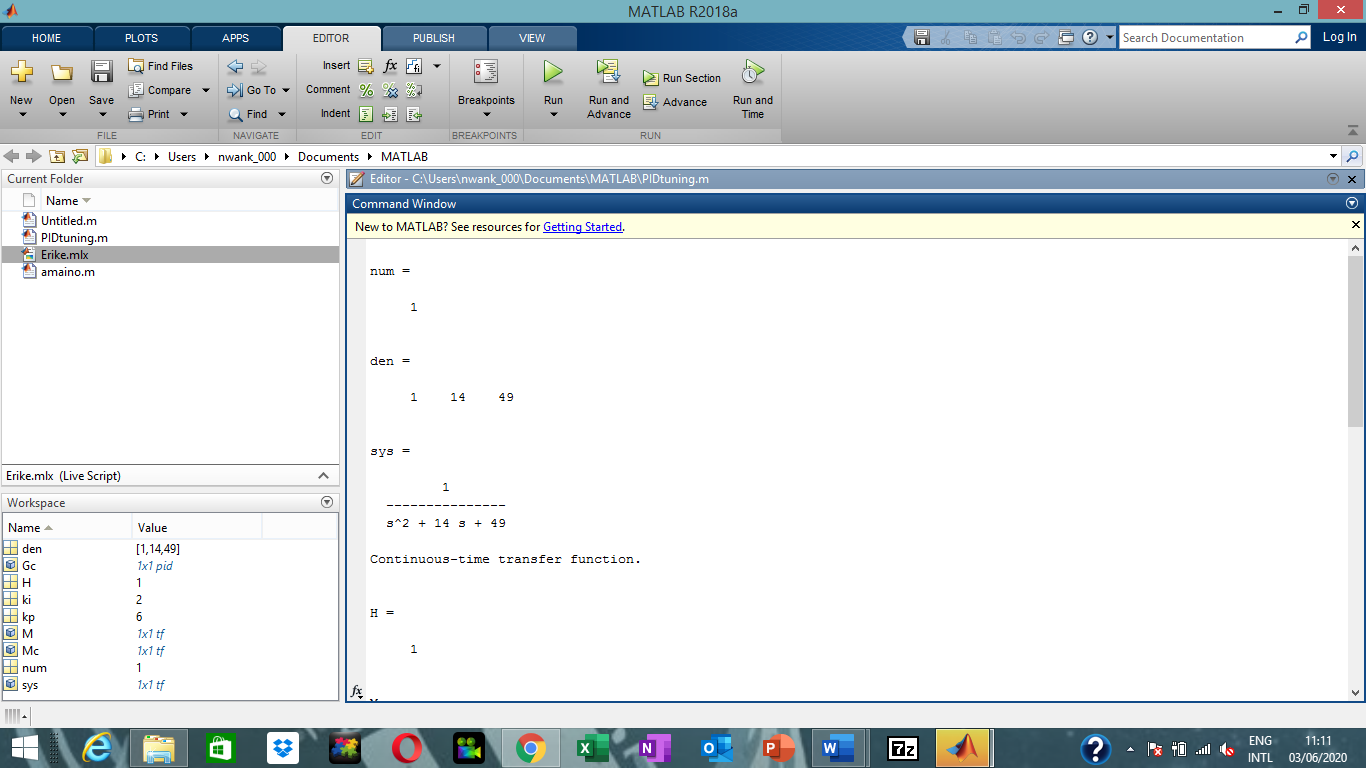
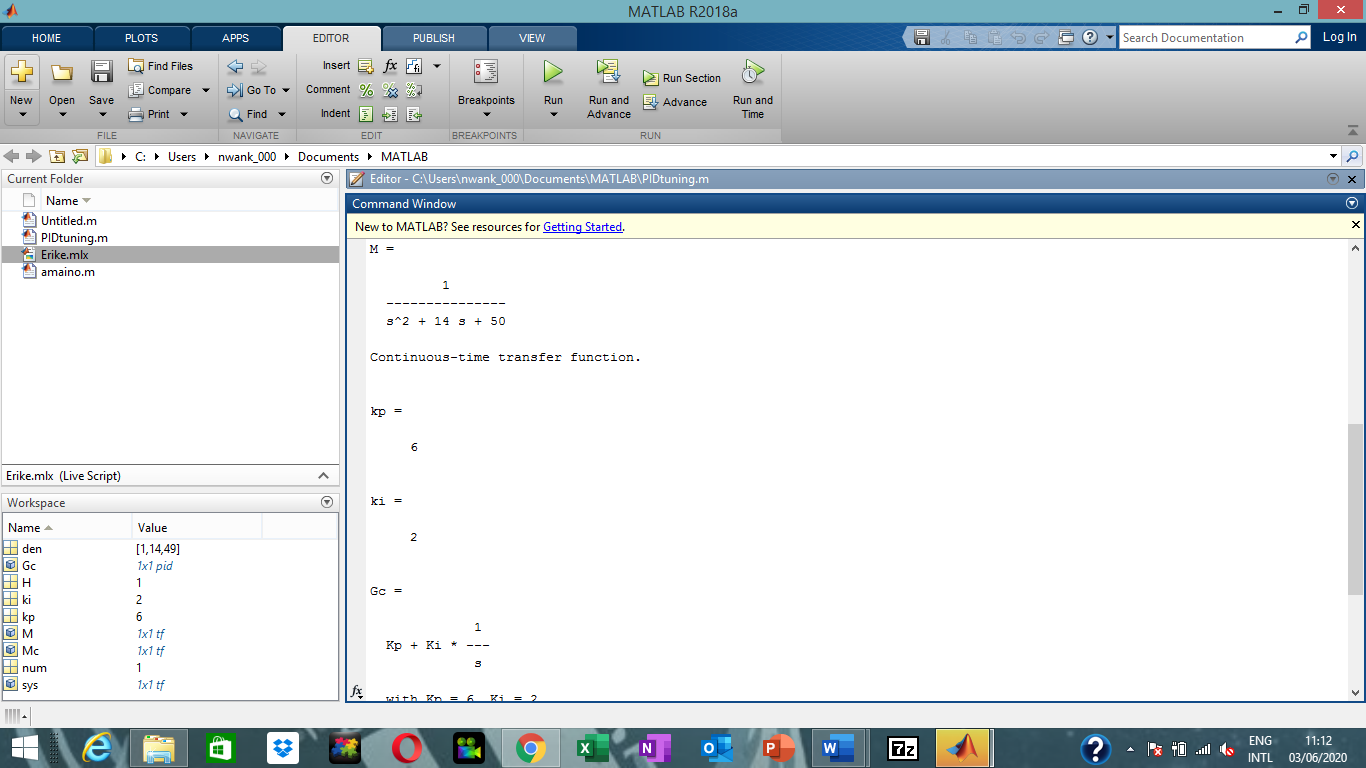
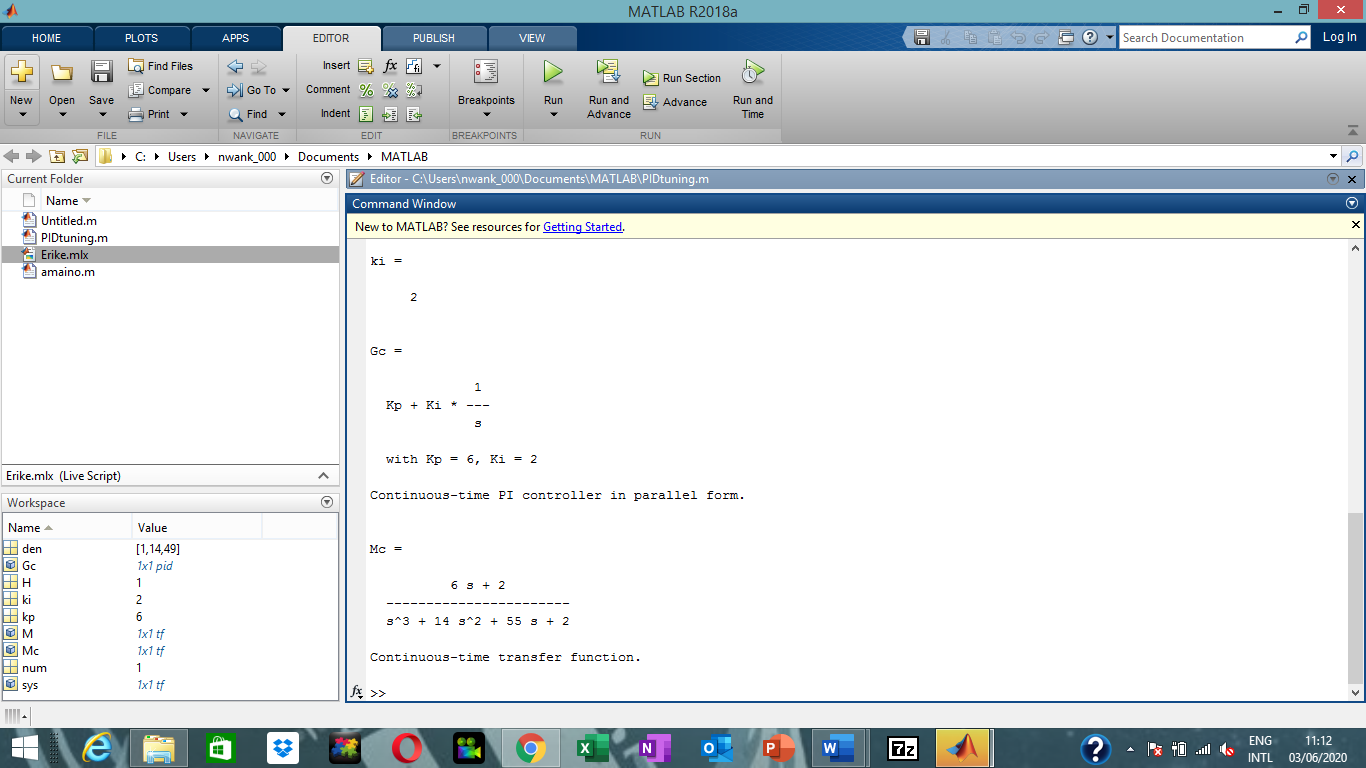
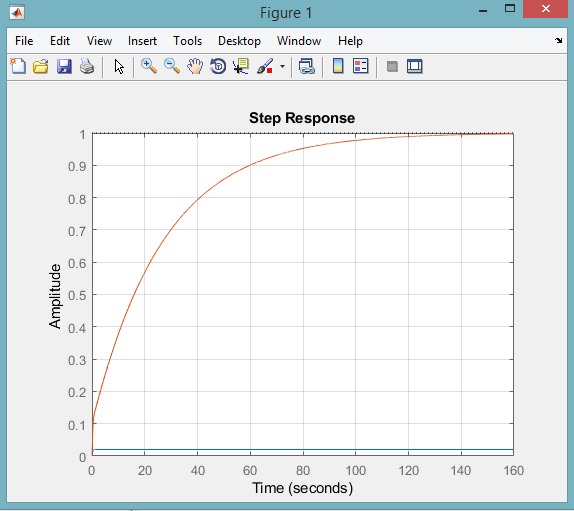
ki=2

Gc=pid(kp,ki)

Mc=feedback(Gc\*sys, H)

step(Mc)

grid on

clear all

clc

num=[1]

den=[1 14 49]

sys=tf(num, den)

H=1

M=feedback(sys,H)

step(M)

hold on

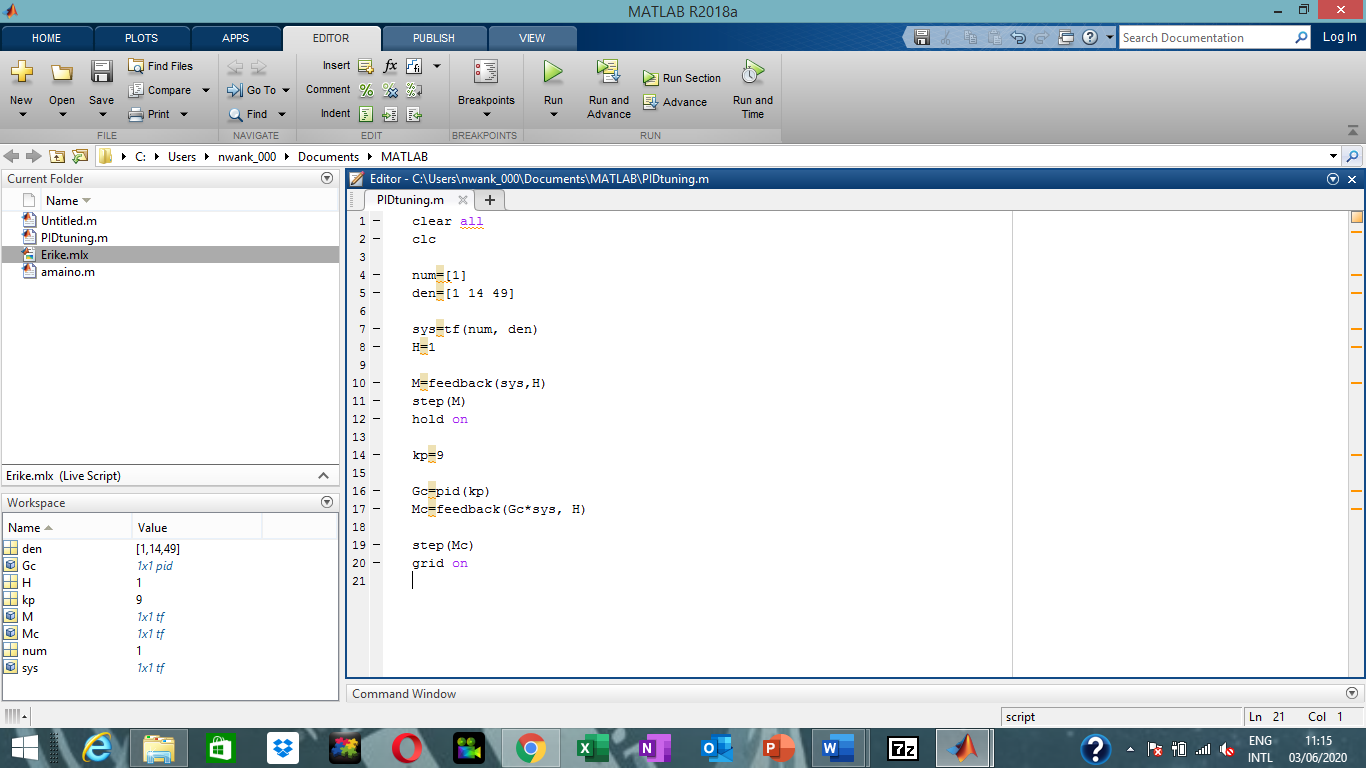
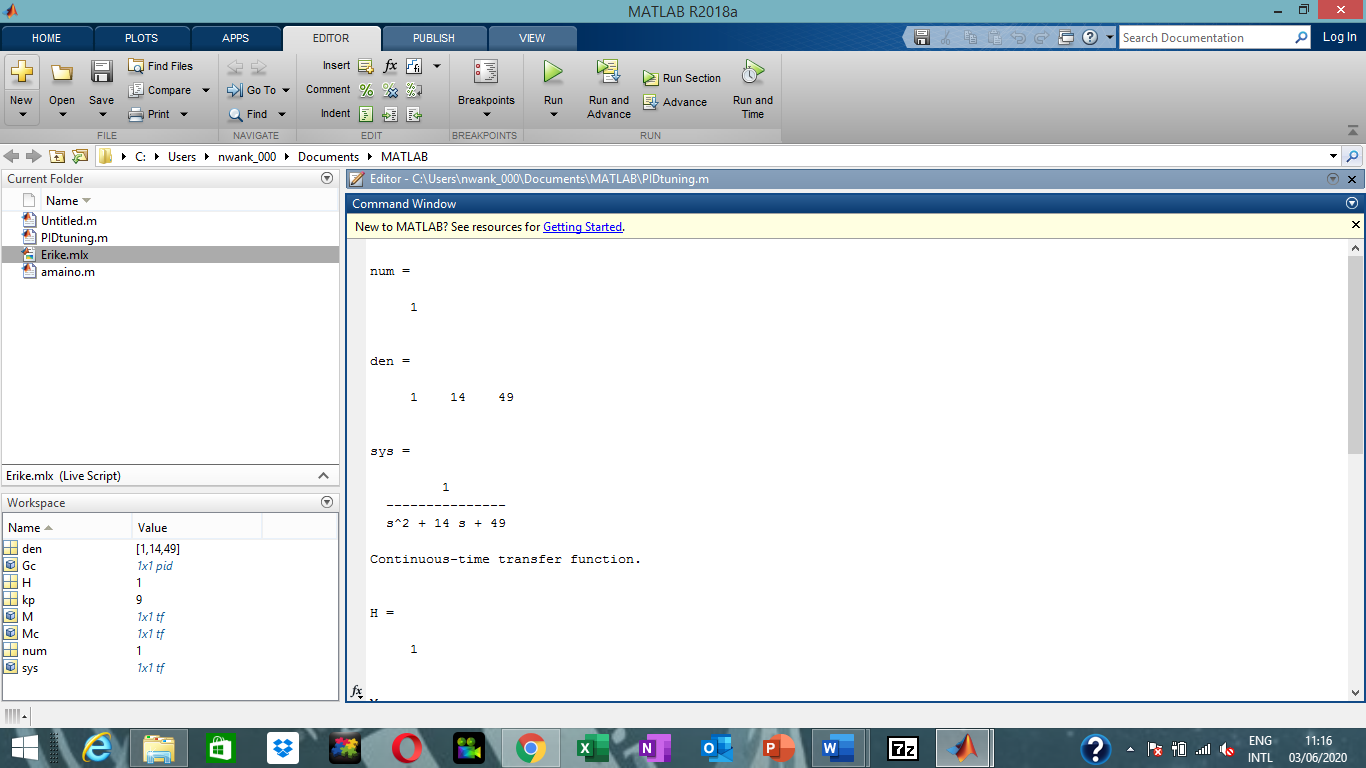
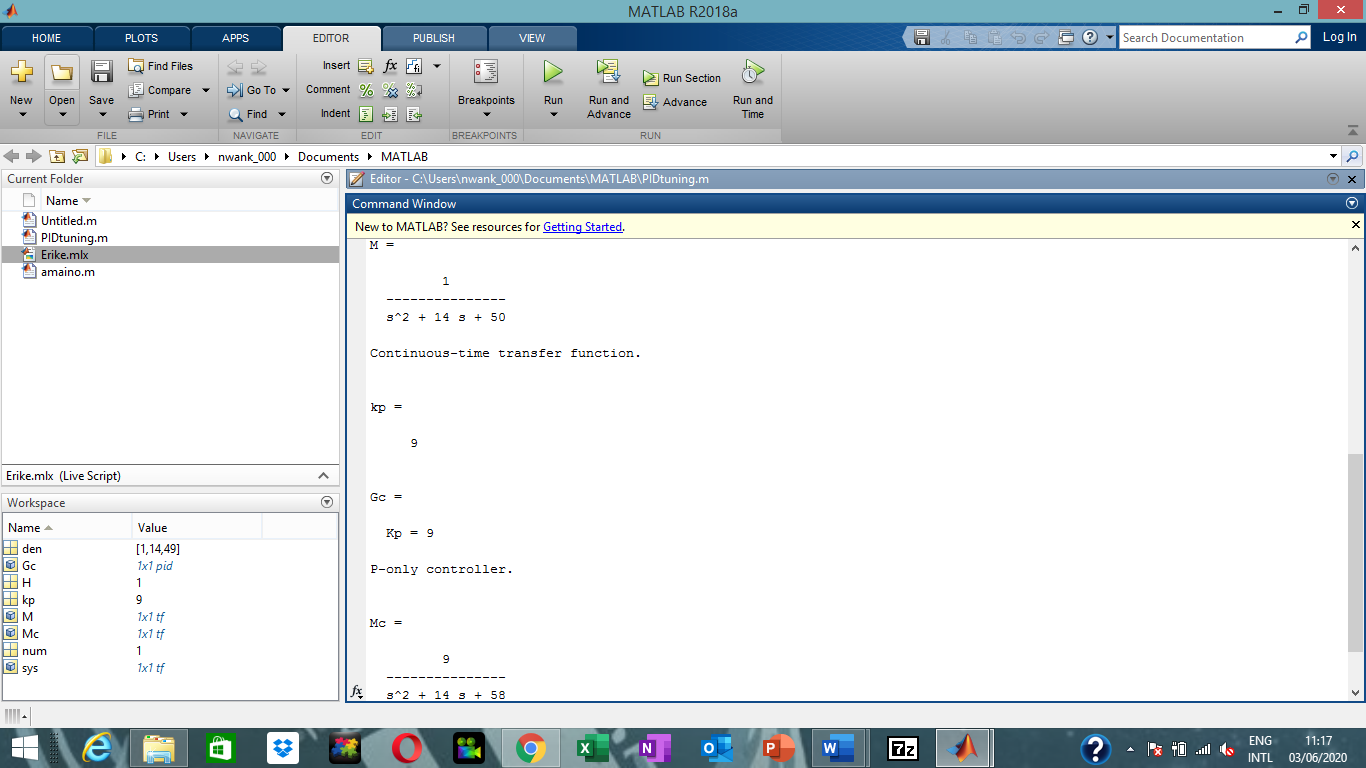
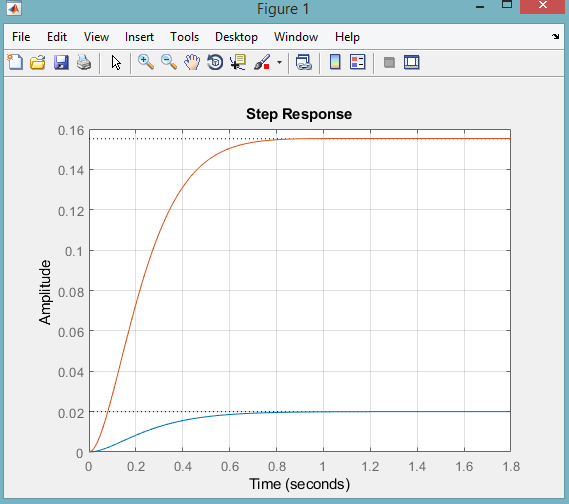
kp=9

Gc=pid(kp)

Mc=feedback(Gc\*sys, H)

step(Mc)

grid on

Observation:

In the PID increasing kp makes it over shoot

Changes in ki,kp,kd values changes the simulation

2) Simc tuning method

clear all

clc

num=[1]

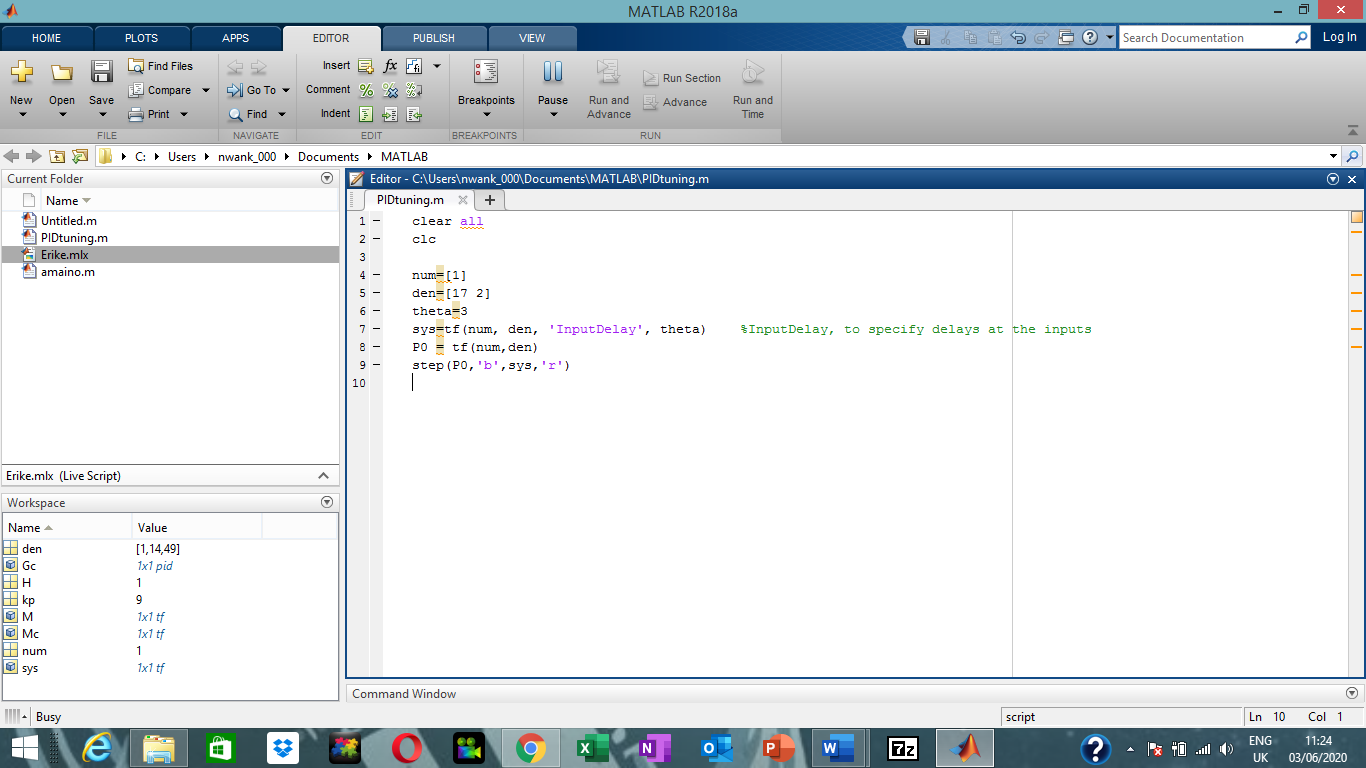
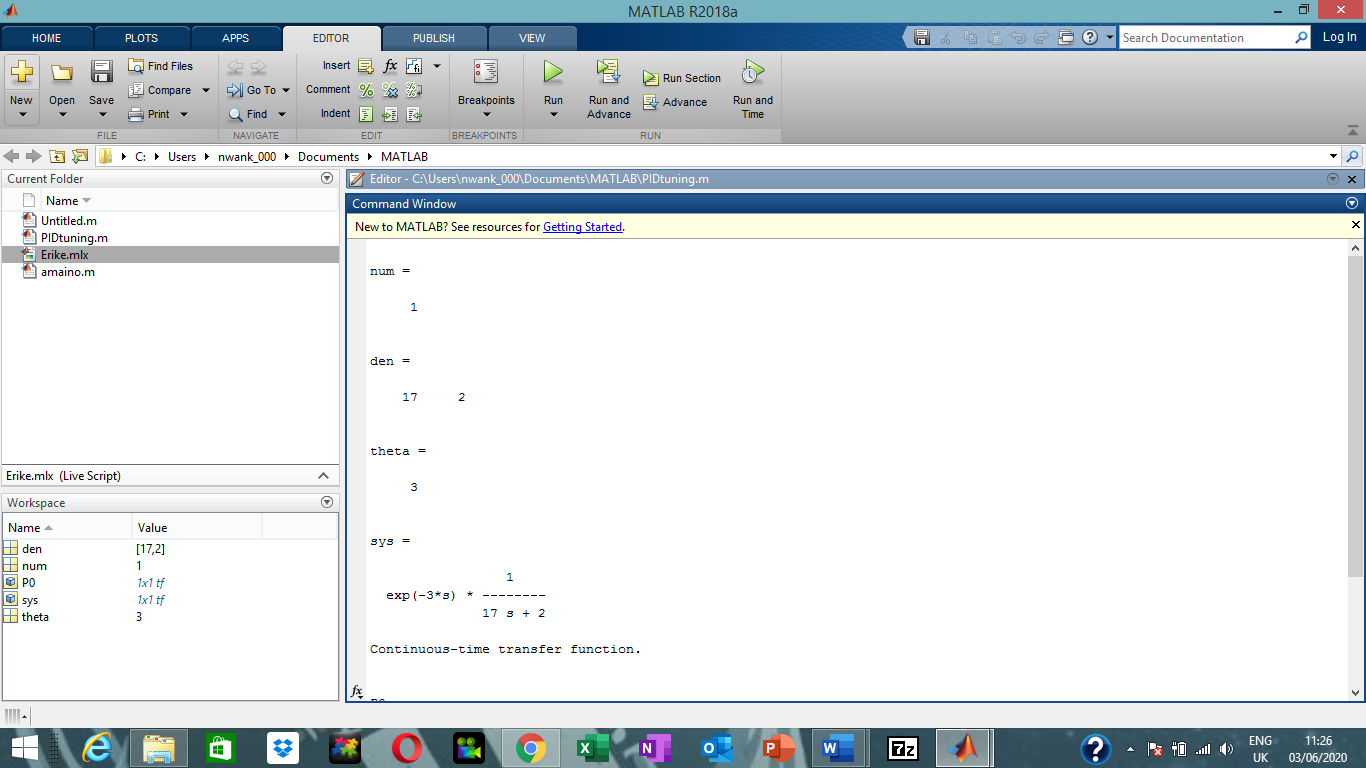
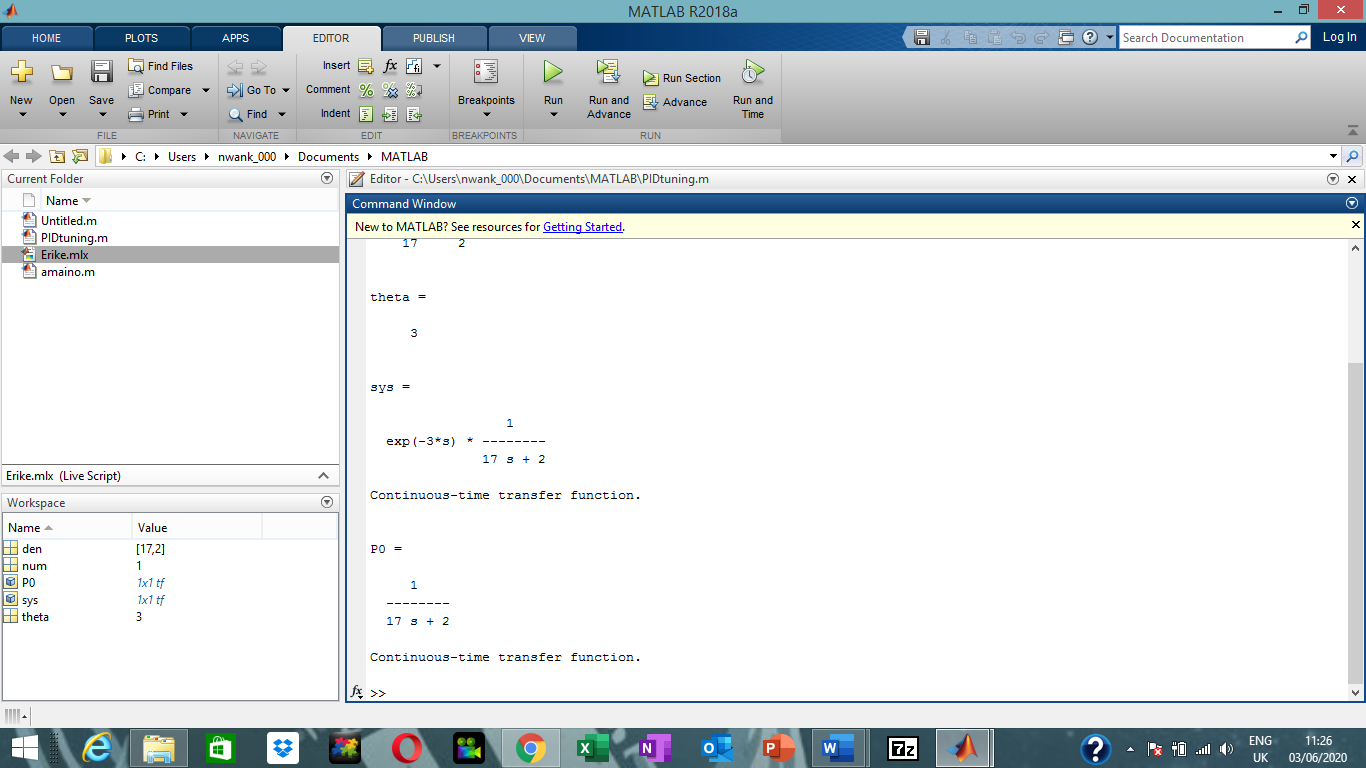
den=[17 2]

theta=3

sys=tf(num, den, 'InputDelay', theta)

P0 = tf(num,den)

step(P0,'b',sys,'r')

clear all

clc

num=[2]

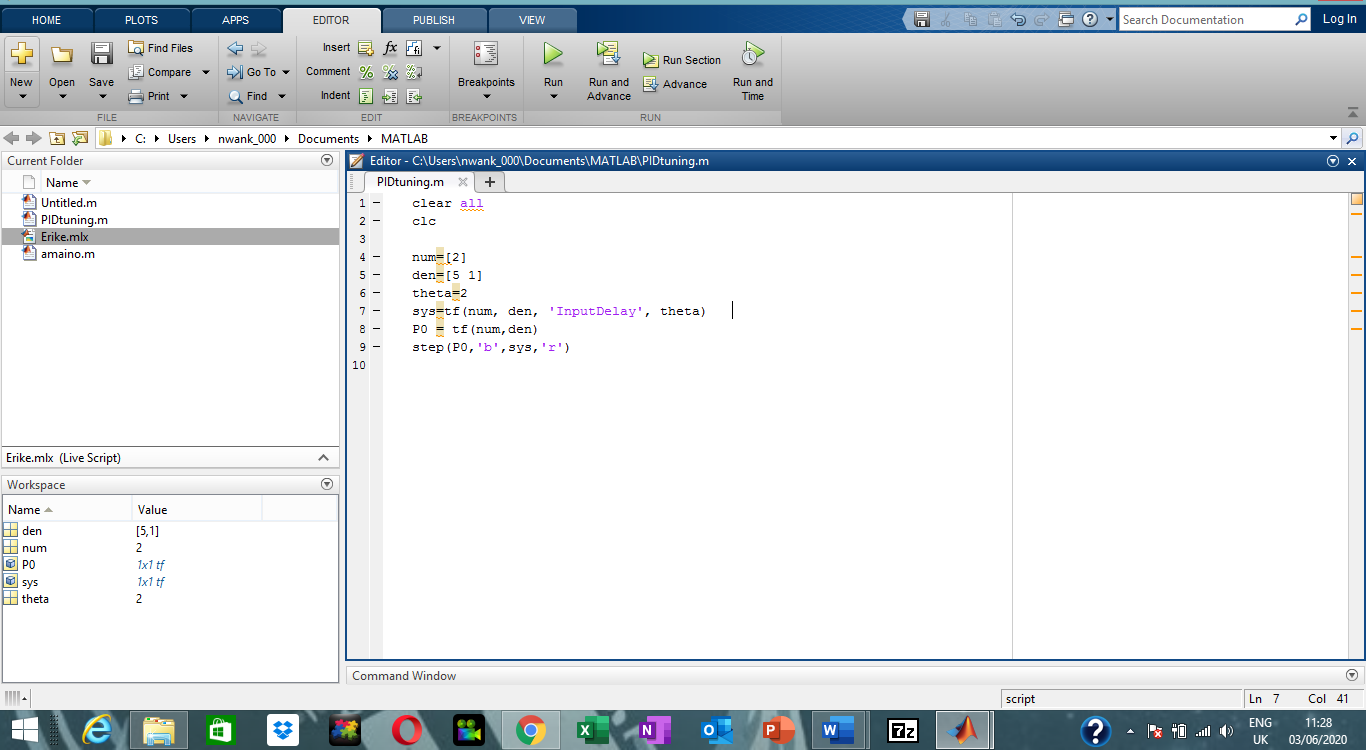
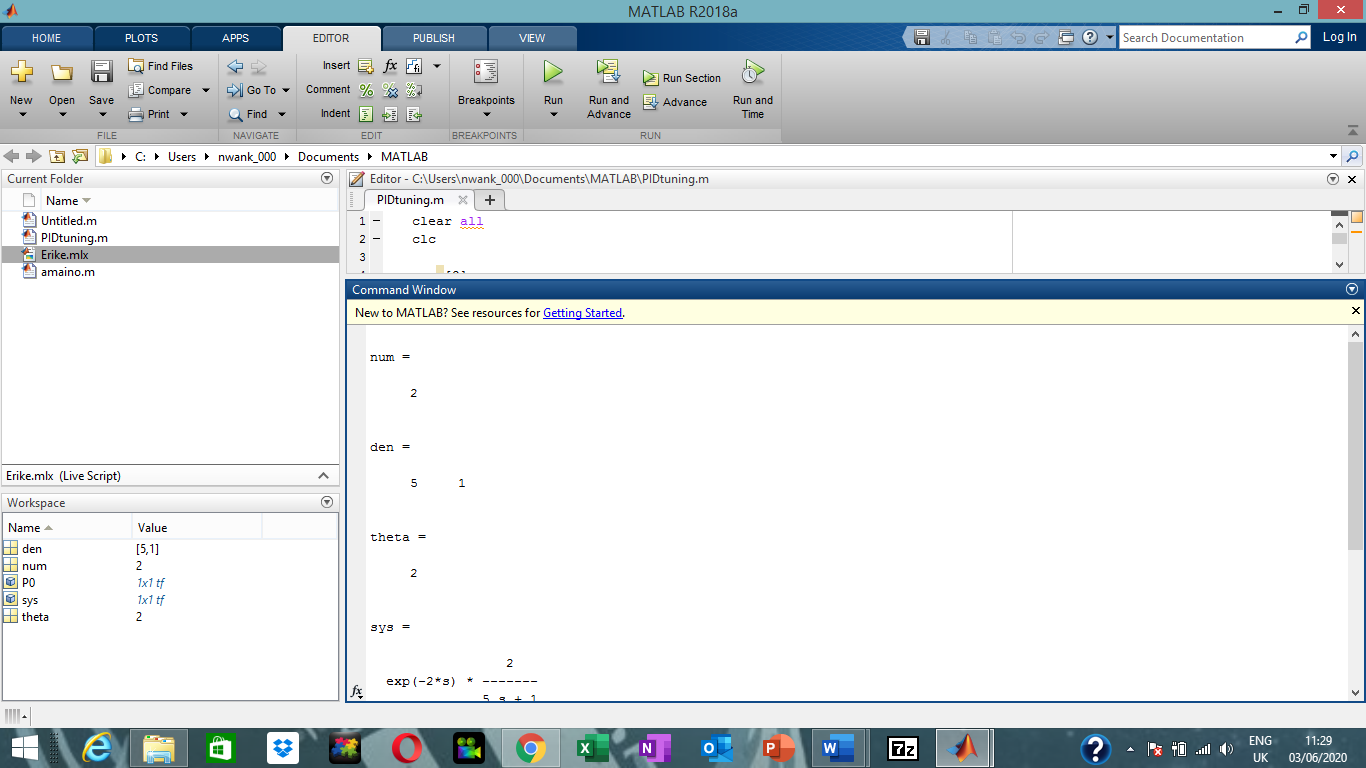
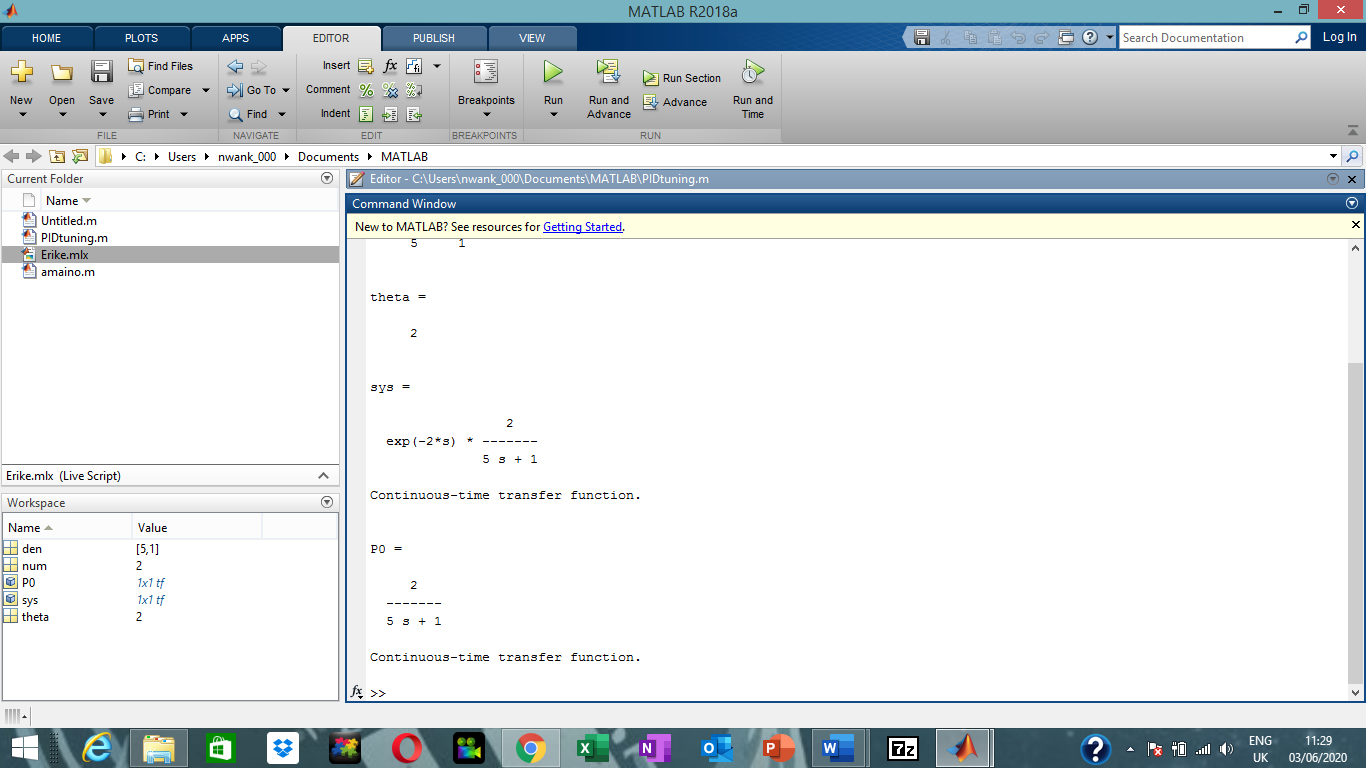
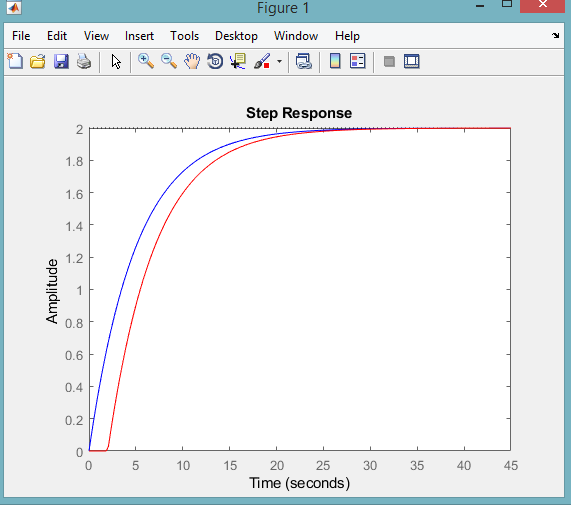
den=[5 1]

theta=2

sys=tf(num, den, 'InputDelay', theta)

P0 = tf(num,den)

step(P0,'b',sys,'r')

Observation:

There is difference in rising time