In the name of God

Univrsity of Tehran

Faculty of engineering

Electrical and computer faculty

**Linear control systems lab**

**preLab8**

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Group numb:5

Azar1398

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# Part 1

## The effect of PID parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Response |  |  |  |  |
|  | Small changes | Increase | Increase | Without changes |
|  | Increase | Increase | Decrease | \_ |
|  | Small changes | Decrease | Decrease | Without changes |

If we divide PID controller into three parallel controllers {proportional, divider, integrator } with respect to changes our system will be more stable , faster and with wider band width. Also in integrator our steady state error will be less and our system will be slower than before.

# Part 2

## PID controller in Matlab

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  | 0.904 | 2.074 | 25.53 | 0 |
|  | 1.199 | 2.759 | 26.579 | 0 |
|  | 0.445 | 0.937 | 11.387 | 0 |
|  | Unstable | Unstable | Unstable |  |

1 p=5.6 D=0.470

I=1 N=212.58

2 p=3.3 D=0.47

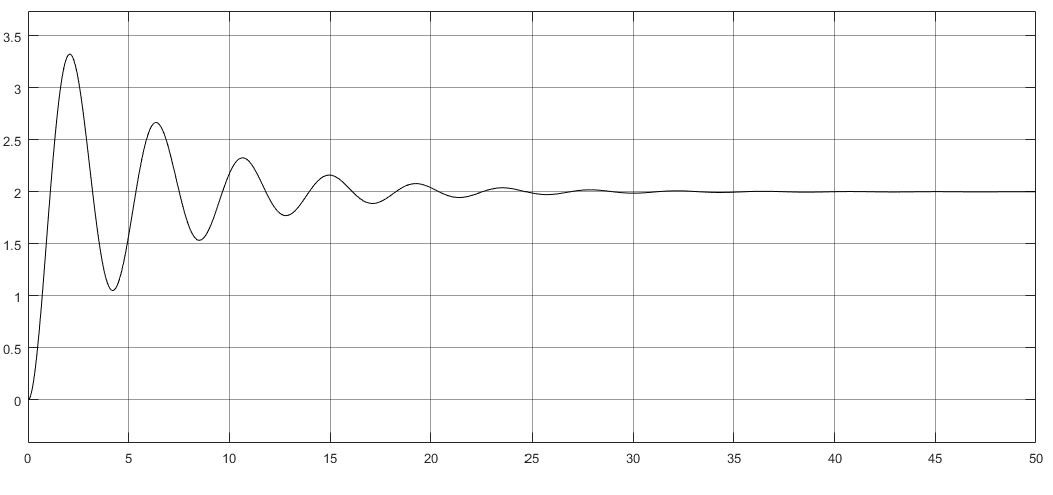
I=1 N=212.765

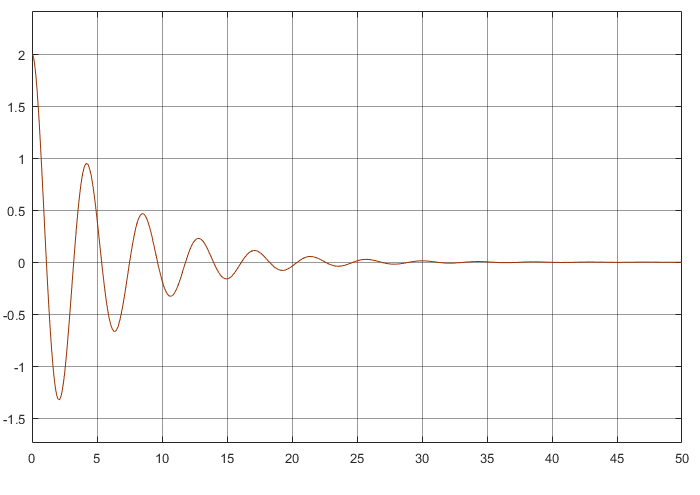
3 p=5.6 D=2.2

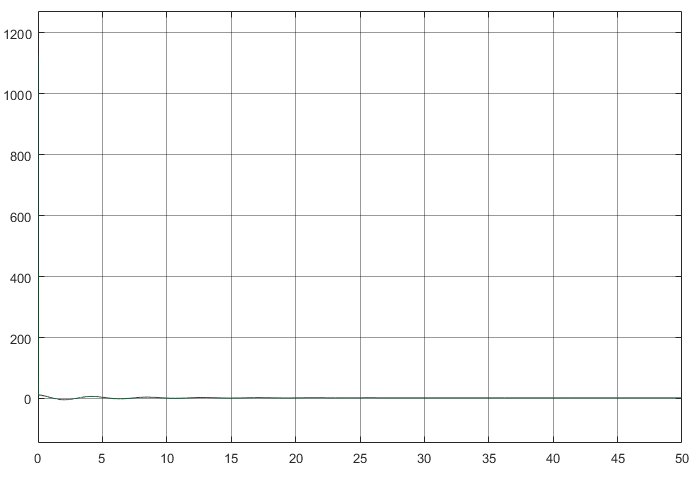
I=1 N=45.454

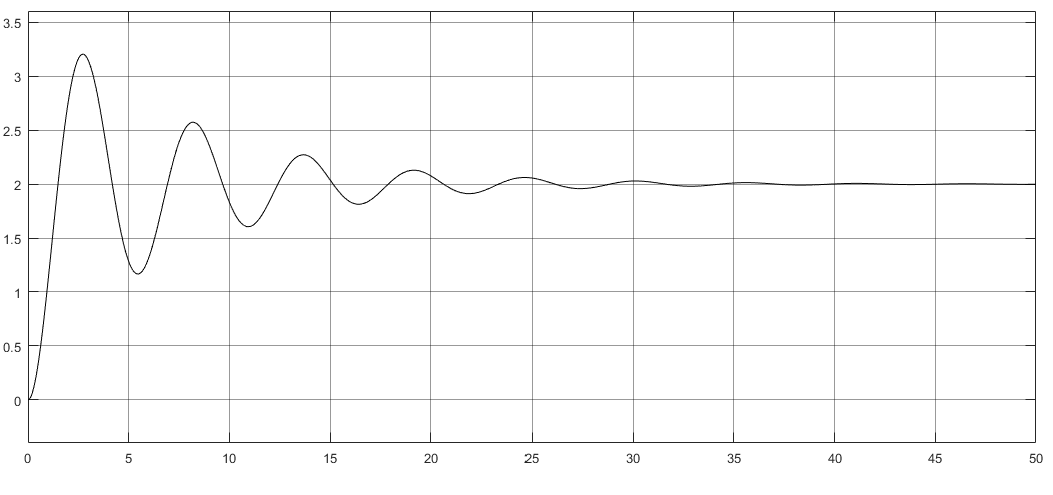
4 p=5.6 D=0.47

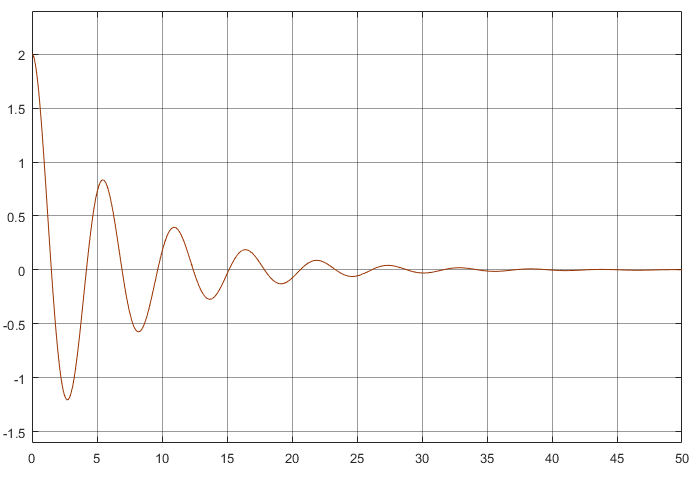
I=2 N=212.765

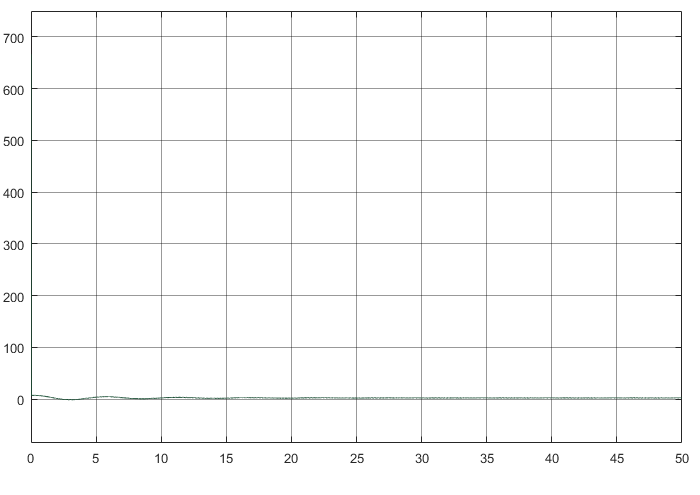
number 1 y(t)

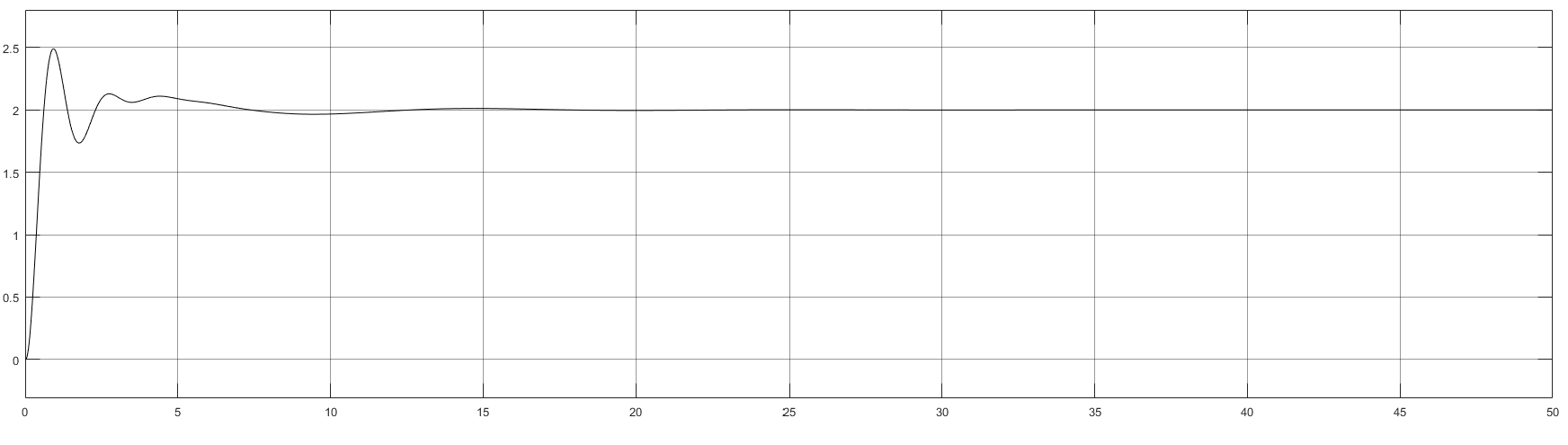
number 1 e(t)

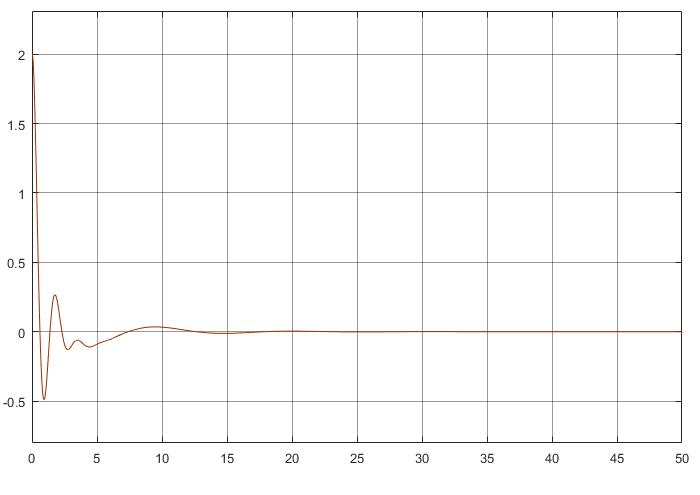
number 1 u(t)

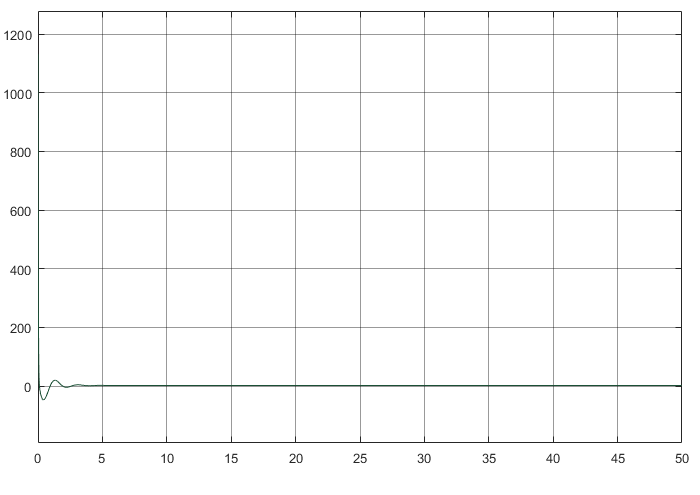
number 2 y(t)

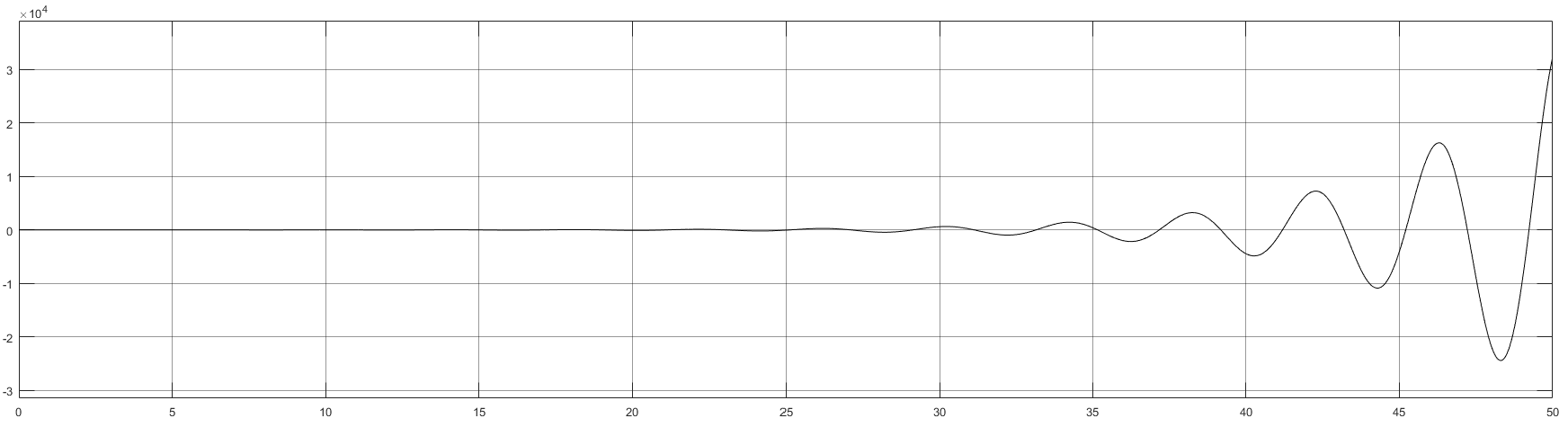
number 2 e(t)

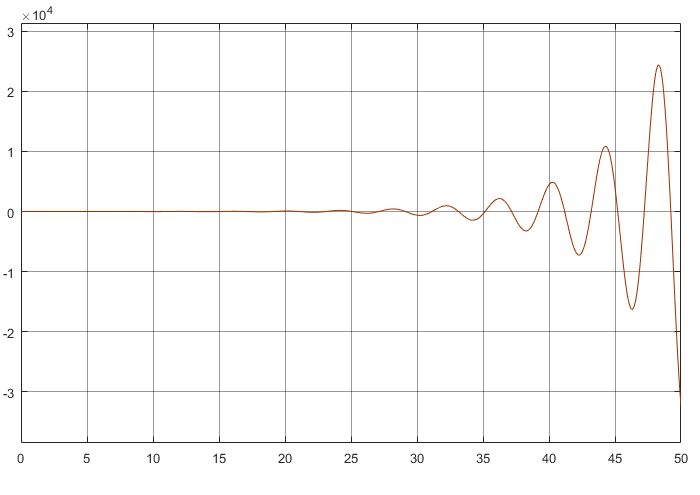
number 2 u(t)

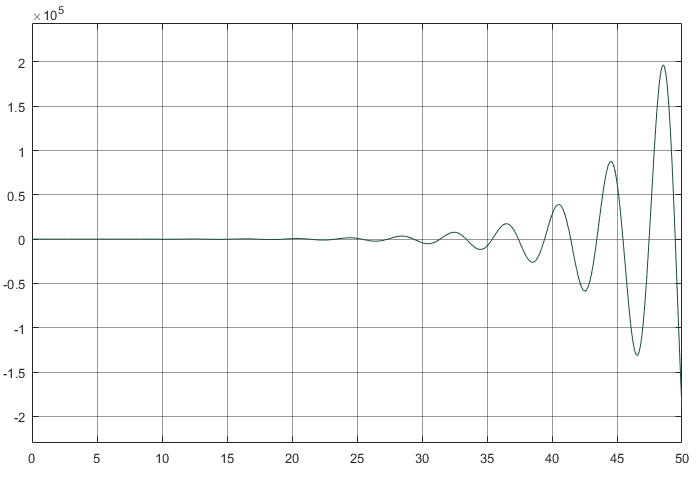
number3 y(t)

number 3 e(t)

number 3 u(t)

number4 y(t)

number 4 e(t)

number 4 u(t)

Q3.

PID controllers due to having integrator and divider at the same time, increase the stability and the speed of our system but as we see before too much increasing of parameters could lead our system to be unstable.