UNIVERSIDAD FIDELITAS

Escuela de Ingeniería Eléctrica

Control automático

Tarea#7

Realizado por:

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Profesor:

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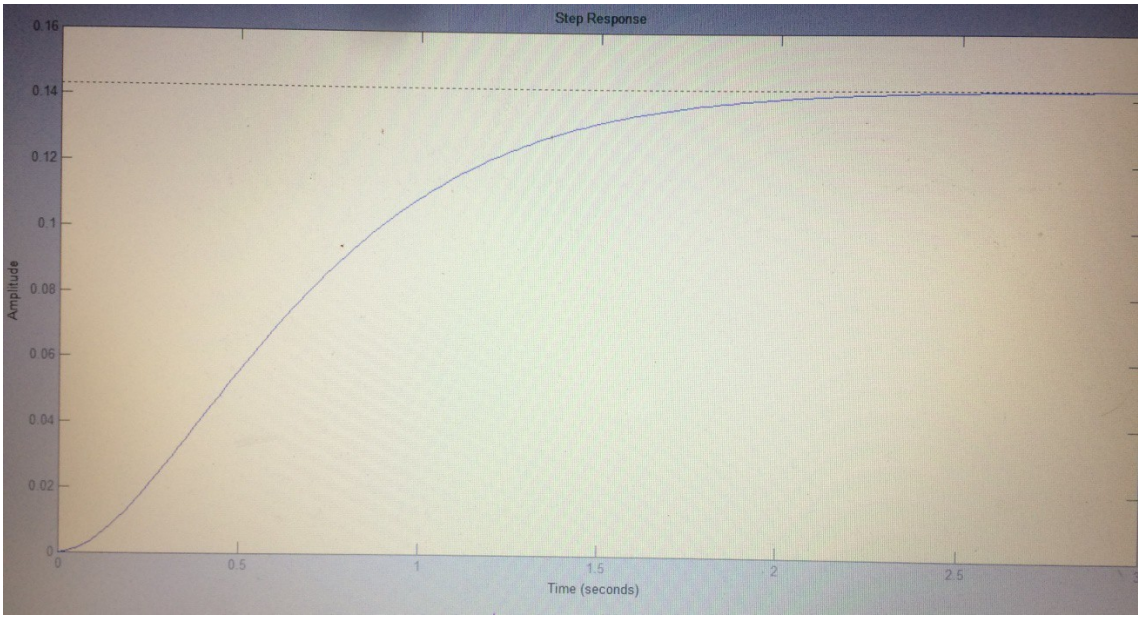
Parte en matlab:

```
>> A=tf([1],[1 5 6])

A =

       1

  -------------

  s^2 + 5 s + 6

Continuous-time transfer function.

>> W=feedback(A,1)

W =

       1

  -------------

  s^2 + 5 s + 7

Continuous-time transfer function.

>> step(W)
```




```
>> E=feedback(1,W)
```

E =

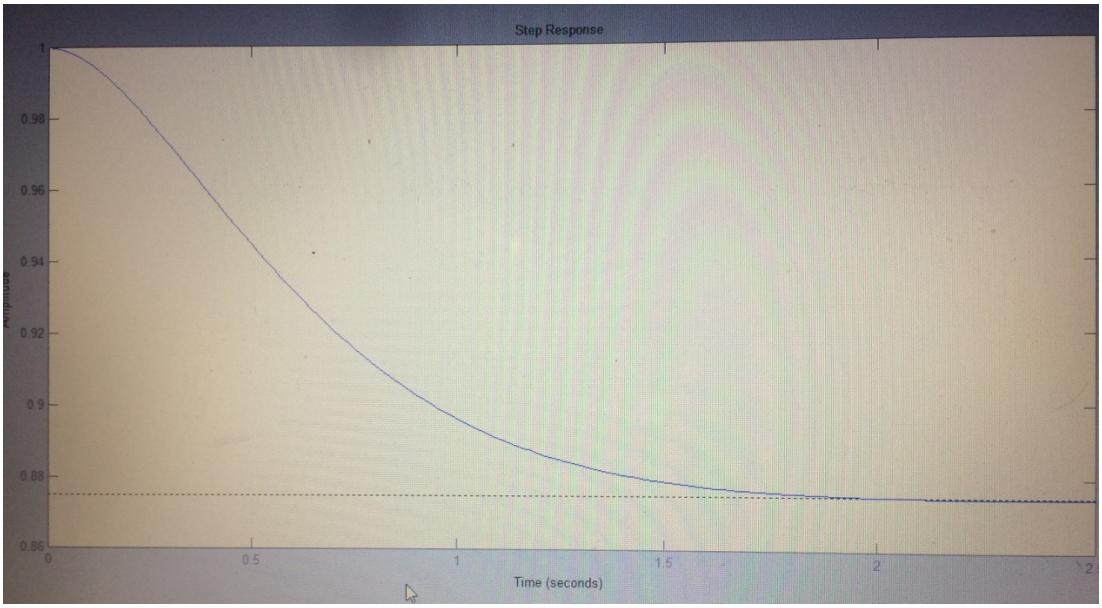
s^2 + 5 s + 7

---

s^2 + 5 s + 8

Continuous-time transfer function.

>> step(E)



>> c=tf([1 1.81],[1 1])

c =

s + 1.81

---

s + 1

>> H=series(c,A)

H =

s + 1.81

---

s^3 + 6 s^2 + 11 s + 6

Continuous-time transfer function.

>> P=feedback(H,1)

P =

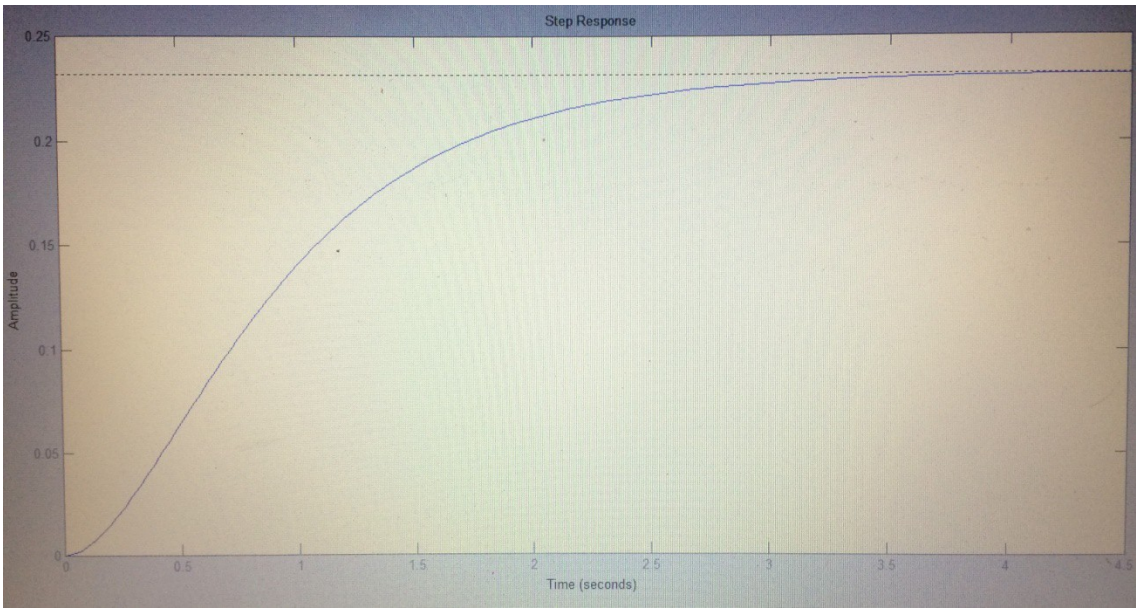
s + 1.81

---

s^3 + 6 s^2 + 12 s + 7.81

Continuous-time transfer function.

>> step(P)



>> EC=feedback(1,H)

EC =

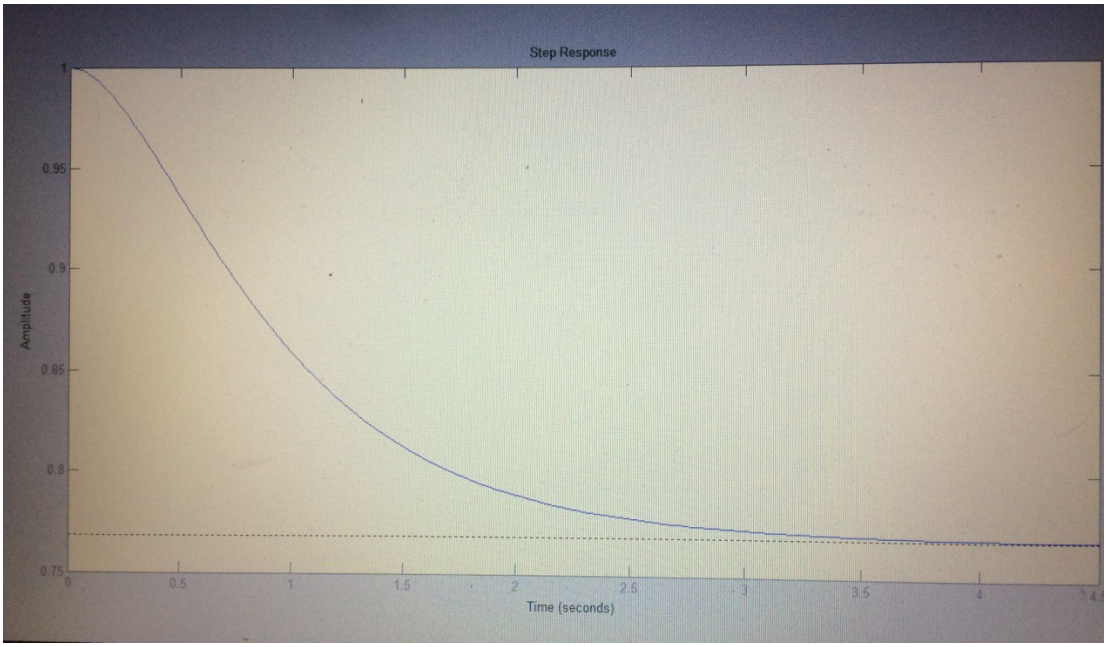
s^3 + 6 s^2 + 11 s + 6

---

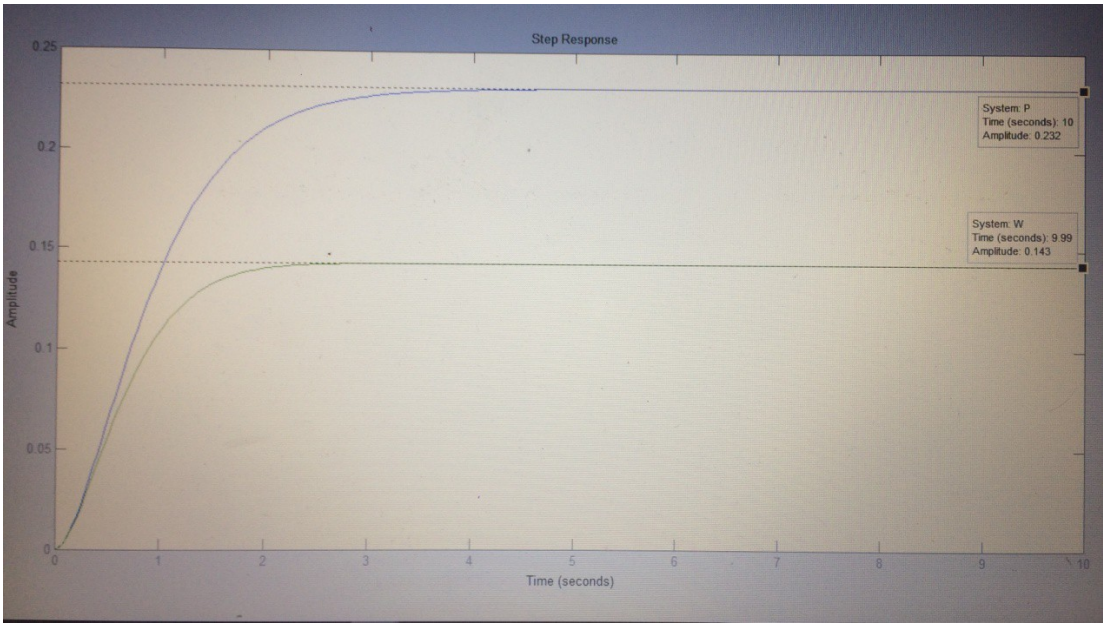
s^3 + 6 s^2 + 12 s + 7.81

Continuous-time transfer function.

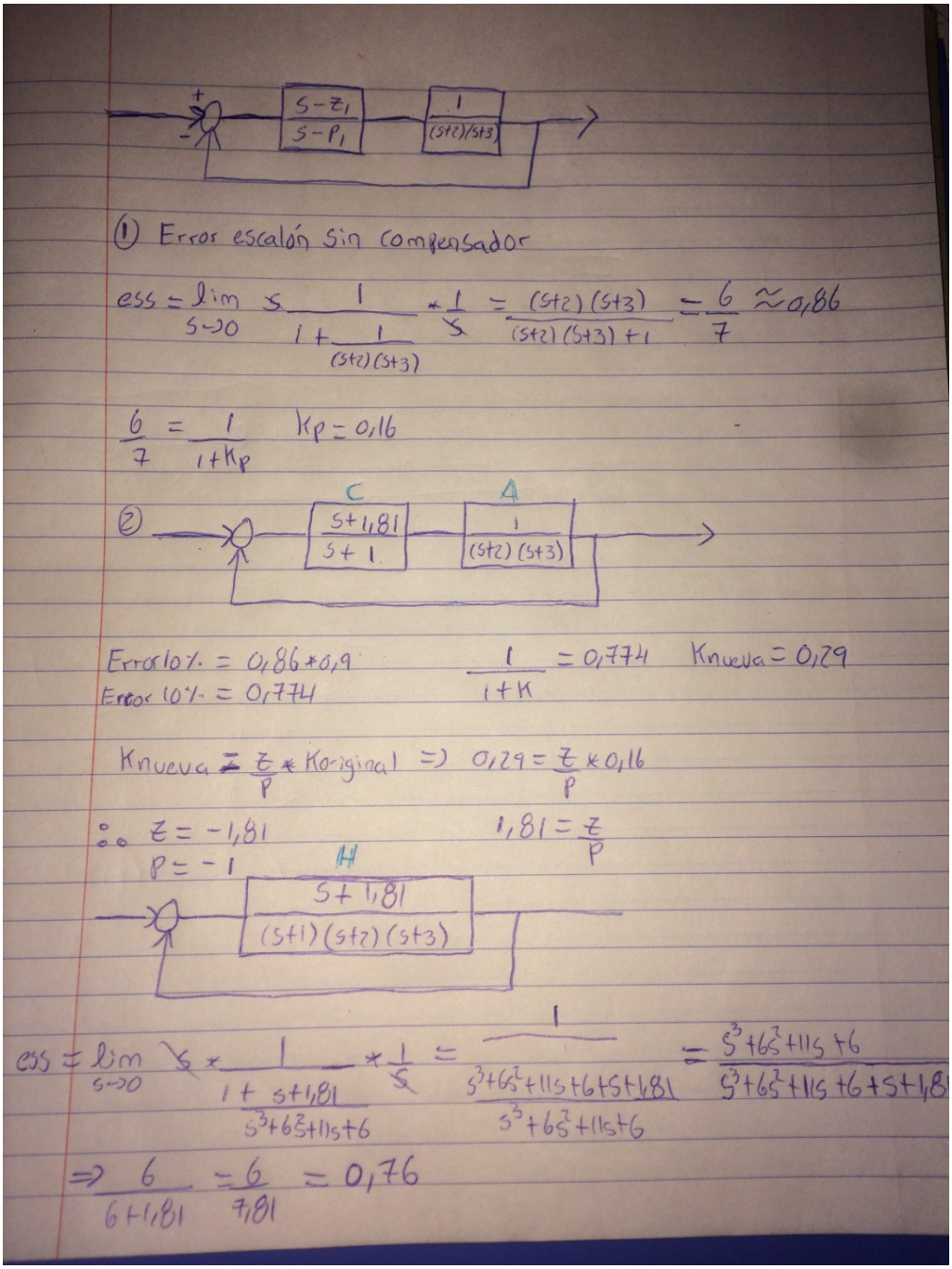
>> step(EC)



>> step(P,W,10)


Step Response
System: P
Time (seconds): 10
Amplitude: 0.232
System: W
Time (seconds): 9.99
Amplitude: 0.143
Amplitude
Time (seconds)
0
0.05
0.1
0.15
0.2
0.25
0
1
2
3
4
5
6
7
8
9
10

Parte a mano


+
-
S-z1
S-p1
1
(S+2)(S+3)
① Error escalón sin compensador
ess = lim s→0 s · 1/(1 + 1/((S+2)(S+3))) · 1/S = (S+2)(S+3)/((S+2)(S+3)+1) = 6/7 ≈ 0,86
6/7 = 1/(1+Kp)
Kp = 0,16
②
C
A
S+1,81
S+1
1
(S+2)(S+3)
Error 10% = 0,86 * 0,9
Error 10% = 0,774
1/(1+K) = 0,774
Knueva = 0,29
Knueva = z/p * Koriginal ⇒ 0,29 = z/p * 0,16
∴ z = -1,81
p = -1
1,81 = z/p
H
S+1,81
(S+1)(S+2)(S+3)
ess = lim s→0 s · 1/(1 + (S+1,81)/(S³+6S²+11S+6)) · 1/S = 1/((S³+6S²+11S+6+S+1,81)/(S³+6S²+11S+6)) = (S³+6S²+11S+6)/(S³+6S²+11S+6+S+1,8
⇒ 6/(6+1,81) = 6/7,81 = 0,76