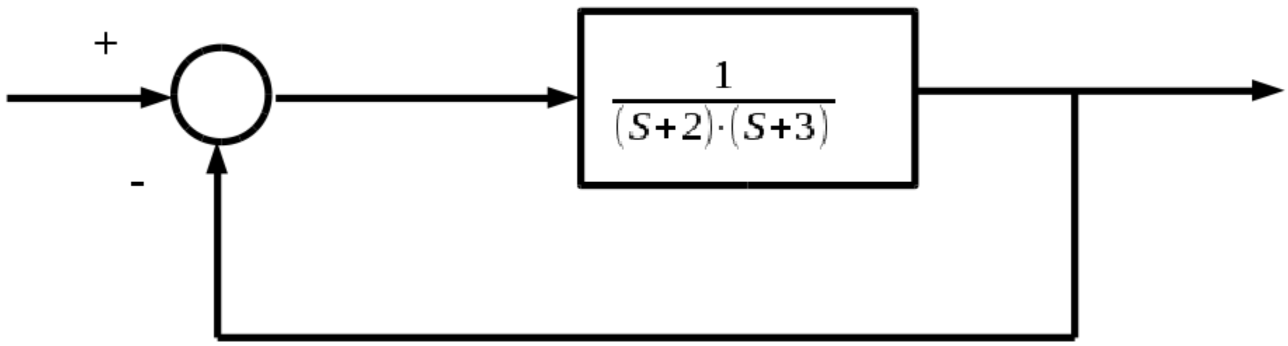
Tenemos el siguiente sistema.



1) Encuentre el error al escalon sin compensador.
2) Proponga un compensador para que el error corriga o mejorar en un 10%.

1.)

$$e_{ss} = \lim s\rightarrow 0 \quad s \frac{1}{1+\frac{1}{(S+2)\cdot(S+3)}} \frac{1}{s} =$$

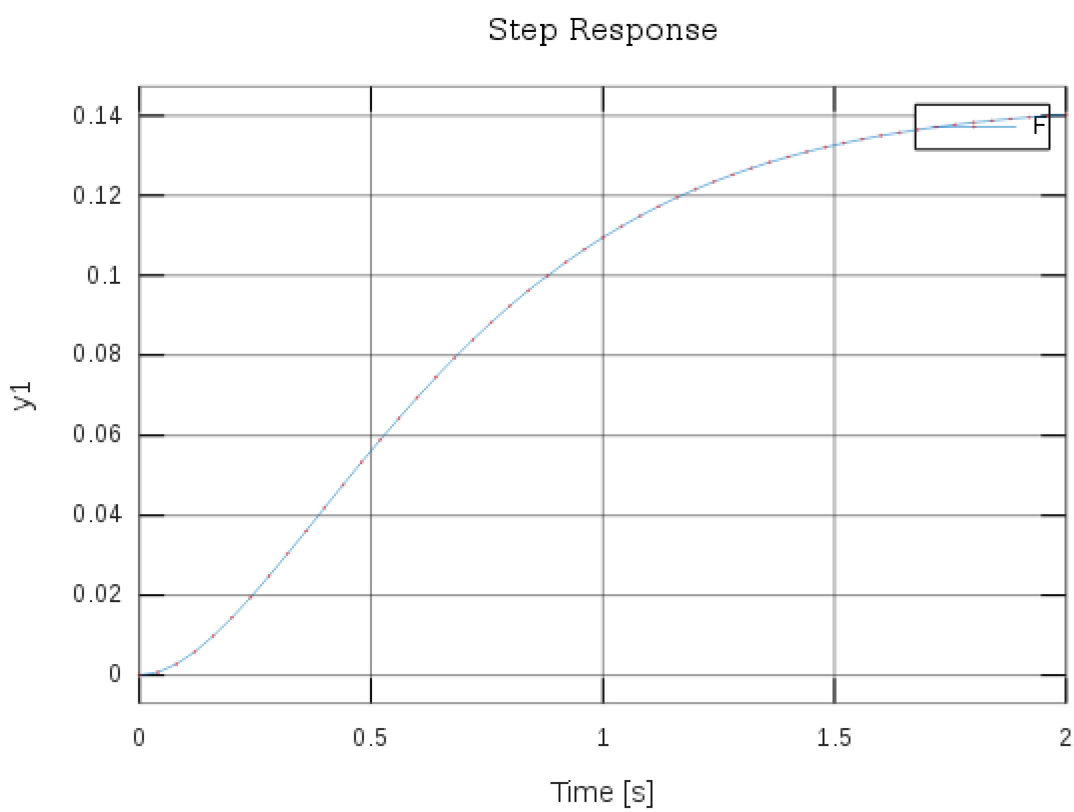
$$= \frac{1}{1+\frac{1}{(0+2)\cdot(0+3)}} = \frac{1}{1+\frac{1}{6}} = 0.86$$

$$K_p=\frac{1}{0,86}-1 = K_p=0,16$$

Comprobacion con Octave

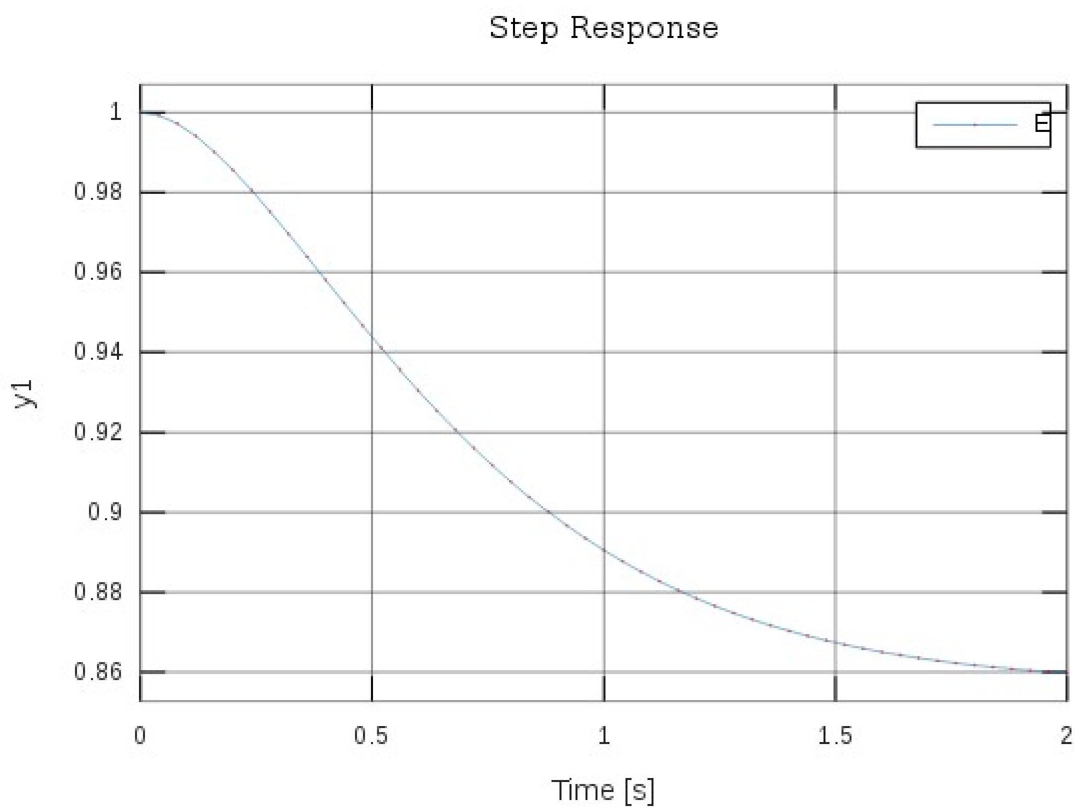
```
octave:1> G=tf([1],[1,5,6])

Transfer function 'G' from input 'u1' to output ...

             1
 y1:  -------------
      s^2 + 5 s + 6

Continuous-time model.
octave:2> F=feedback(G,1)

Transfer function 'F' from input 'u1' to output ...

             1
 y1:  -------------
      s^2 + 5 s + 7

Continuous-time model.
```

```
octave:3> step(F)
```

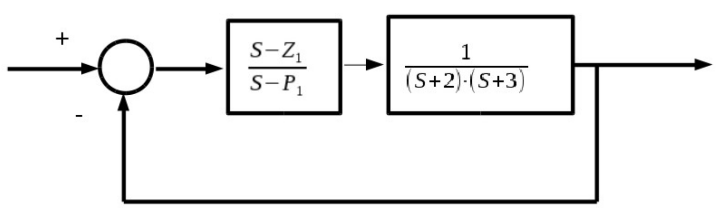


```
octave:4> E=feedback(1,G)

Transfer function 'E' from input 'u1' to output ...

      s^2 + 5 s + 6
 y1:  -------------
      s^2 + 5 s + 7
```

```
octave:5> step(E)
```



Proponga un compensador para que el error corriga o mejorar en un 10%.



$$Error = 0{,}9 \cdot 0{,}86 = 0{,}774$$

$$K_{nueva} = \frac{1}{0{,}774} - 1 = 0{,}29$$

$$\frac{0{,}29}{0{,}16} = \frac{Z}{P}$$

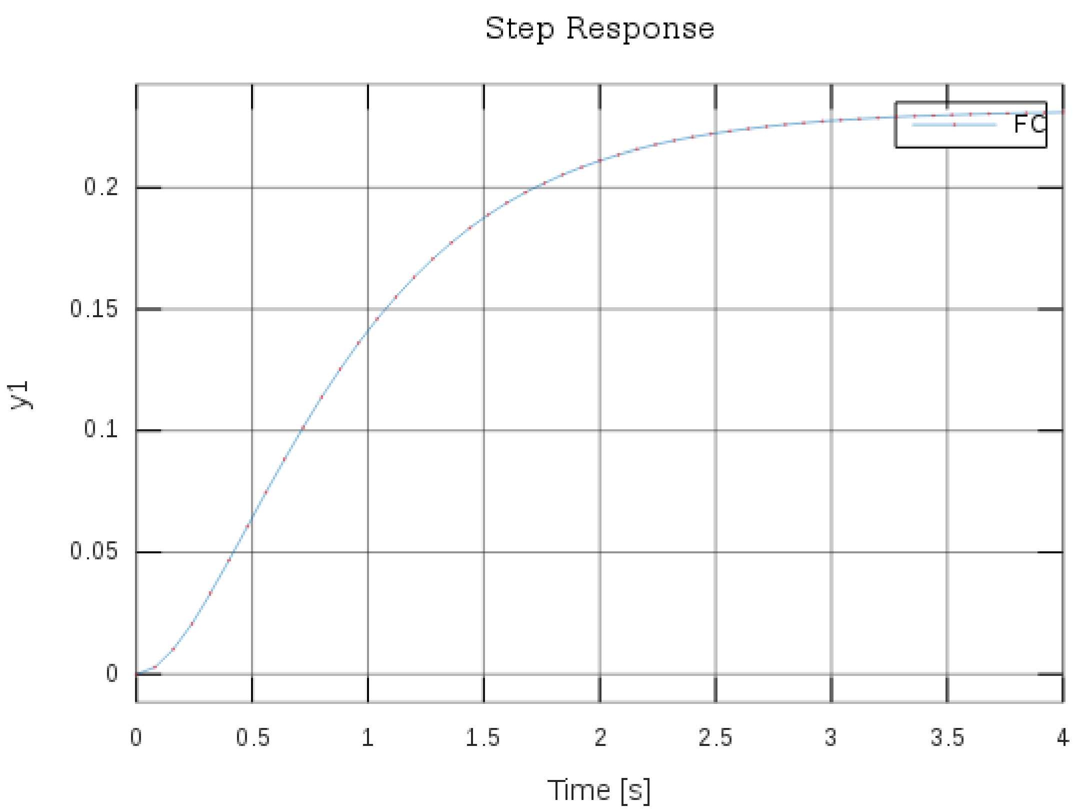
$$1{,}81 = \frac{Z}{P}$$

$$Z = -1{,}81, P = -1$$

Comprobacion con Octave

```
octave:6> C=tf([1,1.81],[1,1])

Transfer function 'C' from input 'u1' to output ...

      s + 1.81
 y1:  --------
       s + 1

Continuous-time model.
octave:7> H=series(C,G)

Transfer function 'H' from input 'u1' to output ...

             s + 1.81
 y1:  ----------------------
      s^3 + 6 s^2 + 11 s + 6

Continuous-time model.

octave:8> FC=feedback(H,1)

Transfer function 'FC' from input 'u1' to output ...

              s + 1.81
 y1:  -------------------------
      s^3 + 6 s^2 + 12 s + 7.81

Continuous-time model.
```

```
octave:9> step(FC)
```




```
octave:10> EC=feedback(1,H)

Transfer function 'EC' from input 'u1' to output ...

        s^3 + 6 s^2 + 11 s + 6
 y1:  -------------------------
       s^3 + 6 s^2 + 12 s + 7.81

Continuous-time model.
```

```
octave:11> step(EC)
```