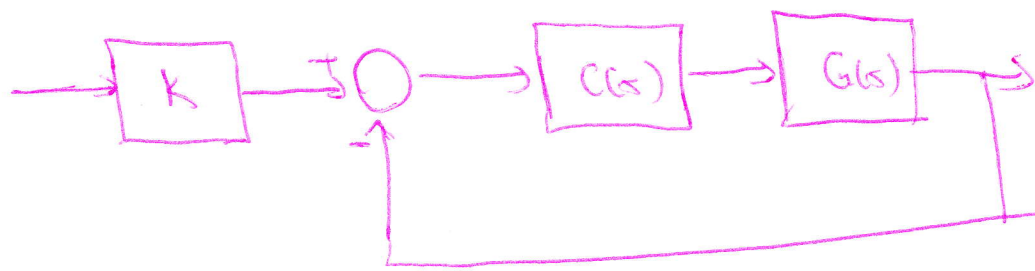


Example 4: Unity Feedback Conf. (Tek dengeleyici var)



$$G(s) = \frac{1}{s-1} = \frac{1+0 \times s}{-1+1 \times s}$$

Desired cl poles:  $-2, -2$

$$C(s) = \frac{B_0 + B_1 s}{A_0 + A_1 s} = ?$$

Solution:

$$\text{Desired } P(s) = (s+2)^2 = 4 + 4s + s^2$$

Diophantine eqs.

$$\begin{bmatrix} -1 & 1 & 0 & 0 \\ 1 & 0 & -1 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} A_0 \\ B_0 \\ A_1 \\ B_1 \end{bmatrix} = \begin{bmatrix} 4 \\ 4 \\ 1 \end{bmatrix} \Rightarrow \begin{aligned} \text{rank} &= 3 \\ \text{let } A_0 &= \alpha \\ B_0 &= 4 + \alpha \\ B_1 &= 5 - \alpha \\ A_1 &= 1 \end{aligned}$$

Thus the compensator,

$$C(s) = \frac{(5-\alpha)s + 4 + \alpha}{s + \alpha} \quad \text{for any } \alpha \text{ will place the poles at } -2$$

$$\text{If } \alpha = 0, \text{ the } C(s)G(s) \text{ is type 1 and } \frac{C(s)G(s)}{1 + C(s)G(s)} = \frac{5s + 4}{s^2 + 4s + 4}$$

Thus, the overall systems with  $k=1$  will track any steps ref i/p