

Stable by

문제 3 Routh - Hurwitz Criteria

$$CLTF = \frac{k(s+4)}{s^3 + 3s^2 + 2s} \cdot \frac{1}{1 + \frac{k(s+4)}{s^3 + 3s^2 + 2s}}$$

$$CE = s^3 + 3s^2 + 2s + k(s+4) = s^3 + 3s^2 + (k+2)s + 4k$$

Routh	s^2	1	$k+2$
Array	s^2	3	$4k$
	s^1	a_1	a_2
	s^0	b_1	b_2

$$a_1 = \frac{-1 \times \begin{vmatrix} 1 & k+2 \\ 3 & 4k \end{vmatrix}}{3} = \frac{-1}{3} (4k - 3k - 6) = -\frac{1}{3} (k-6)$$

$$a_2 = 0$$

$$b_1 = - \frac{\begin{vmatrix} 3 & 4k \\ a_1 & 0 \end{vmatrix}}{a_1} = \frac{+4ka_1}{a_1} = +4k$$

$$+4k > 0 \quad \leftarrow k > 0$$

$$-\frac{1}{3} (k-6) > 0 \quad k < 6$$

Routh Array 접근차이 -1이 계수 곱하심.