Tesis teorica

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$$\frac{C(s)}{R(s)} = \frac{K}{s^3 + 3s^2 + 2s + K}$$

estavel se raizes polos positivos logo raizes do denominador ≠ 0

3	1	2
2	3	K
1	b_{n-1}	0
0	c_{n-1}	

$$b_{n-1} = -\frac{1}{3} \cdot \begin{vmatrix} 1 & 2 \\ 3 & K \end{vmatrix} = \frac{-1}{3} (K-6) = \frac{6-K}{3}$$

$$c_{n-1} = -\frac{1}{\frac{(6-K)}{3}} \cdot \begin{vmatrix} 3 & K \\ \frac{6-K}{3} & 0 \end{vmatrix} = K$$

$$\begin{cases} \frac{6-K}{3} > 0 \\ K > 0 \end{cases} \Rightarrow \begin{cases} K < 6 \\ K > 0 \end{cases} \Big\{ \quad 0 < K < 6$$

Routh-Hurwitz

4	1	1	1
3	K	1	0
2	b_{n-1}	b_{n-3}	
1	c_{n-1}		
0	d_{n-1}		

$$b_{n-1} = -\frac{1}{K} \begin{vmatrix} 1 & 1 \\ K & 1 \end{vmatrix} = \frac{-1}{K} \cdot (1-K) = \frac{K-1}{K}$$

$$b_{n-3} = -\frac{1}{K} \begin{vmatrix} 1 & 1 \\ K & 0 \end{vmatrix} = -\frac{1}{K} (-K) = 1$$

∴

4	1	1	1
3	K	1	0
2	$\frac{K-1}{K}$	1	
1	c_{n-1}		
0	d_{n-1}		

$$c_{n-1} = -\frac{K}{K-1} \cdot \begin{vmatrix} K & 1 \\ \frac{K-1}{K} & 1 \end{vmatrix}$$

$$= -\frac{K}{K-1} \left(K - \frac{K-1}{K} \right)$$

$$= -\frac{k^2}{k-1} + 1 = 1 - \frac{k^2}{k-1}$$

$$d_{n-1} = -\frac{1}{1-\frac{k^2}{k-1}} \begin{vmatrix} \frac{k-1}{k} & 1 \\ 1-\frac{k^2}{k-1} & 0 \end{vmatrix} = \frac{1}{\cancel{1-\frac{k^2}{k-1}}} \left(\cancel{1-\frac{k^2}{k-1}} \right) = 1$$

4	1	1	1
3	k	1	0
2	$\frac{k-1}{k}$	1	
1	$1-\frac{k^2}{k-1}$		
0	1		

	$-\infty$	0		1		$+\infty$
k	$-$	0	+	+	+	+
$\frac{k-1}{k}$	+ + +	∞	$-$	0	+	+
$1-\frac{k^2}{k-1}$	+ + +	1		$-\infty$	$-$	$-$

good Professor.

>> não há nenhuma situação estável.