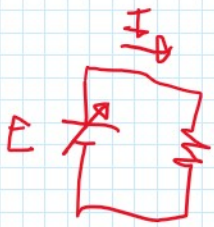
→ MODELAGEM
→ ANALISE
→ PROJETO



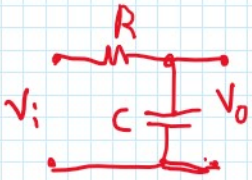
$I = E/R$

FUNÇÃO TRANSFERENCIA
DIAGRAMAS EM BLOCOS

TRANSITÓRIA
ERRO
ESTABILIDADE
LUGAR DAS RAÍZES
DIAGRAMA DE BODE

→ IMPLEMENTAÇÃO

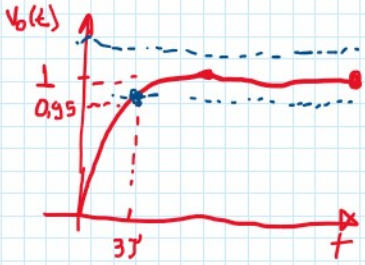
CIRCUITO RC



$$G(s) = \frac{V_0(s)}{V_i(s)} = \frac{1}{\tau s + 1}$$

$\tau = R \cdot C$

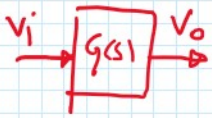
DEGRAU

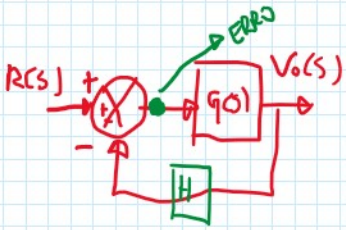


$t_{s\,5\%} = 3\tau = 3s$

$R = 1\,\Omega$

$C = 1\,F$





$$FTMF = \frac{G}{1+GH} = \frac{\frac{1}{\tau s+1}}{1+\frac{1}{\tau s+1}\cdot 1} = \frac{1}{\tau s+2} = \frac{0{,}5}{\frac{\tau}{2}s+1}$$

ERRO REG. PERM. → TIPO ENTRADA

$e_{ss} = 0{,}5$

- $K_p \rightarrow \frac{1}{1+K_p}$
- $K_v \rightarrow 1/K_v$
- $K_a \rightarrow 1/K_a$

LUGAR RAÍZES

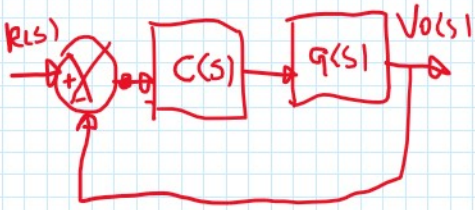
$1 + GH = \emptyset$ { MODULO, ANGULO

PROJETO

$$C(s) = K_p + K_i = K_i\left(\frac{K_p}{K_i}s + 1\right)$$

$\tau = K_p/K_i$

PROJETO



$$C(s) = K_p + \frac{K_i}{s} = \frac{K_i\left(\frac{K_p}{K_i}s + 1\right)}{s} \rightarrow T = K_p/K_i$$

$$FTLA = \frac{K_i}{s} = \frac{K_i\left(\frac{K_p}{K_i}s + 1\right)}{s} \cdot \frac{1}{(Ts+1)}$$

$$FTMF = \frac{\frac{K_i}{s}}{1 + \frac{K_i}{s}} = \frac{K_i}{s + K_i} = \frac{1}{\frac{s}{K_i} + 1}$$

$$T_N = \frac{1}{K_i}$$

$$t_{s\,5\%} = 1s \rightarrow T_N = \frac{1}{3} \rightarrow K_i = 3 \rightarrow K_p = 3$$