18.11.2024

Teoria sistemelor
(laborator 8 - S8)

5/6 laborator 3

$$H_0(z) = \frac{0,2z + 0,5}{z^2 - 1,2z + 0,2}$$

$$\Delta(z) = 1 + H_0 = \frac{z^2 - z + 0,7}{z^2 - 1,2z + 0,2} = 0$$

$$\Rightarrow z^2 - z + 0,7 = 0$$

$a_2 = 1 > 0$ $\quad a_1 = -1$ $\quad a_0 = 0,7$

n - par $\qquad n = 2 \Rightarrow$ 3 condiții necesare

1) $\Delta(1) = 1^2 - 1 + 0,7 = 0,7 > 0$

2) $\Delta(-1) = (-1)^2 - (-1) + 0,7 = 2,7 > 0$

3) $|a_0| < a_n$

$\Leftrightarrow 0,7 < 1$

$\Rightarrow$ sistemul e stabil

	z^0	z^1	z^2
1	0,7	-1	1
2	1	-1	0,7

6/6 laborator 3

$$H_0(z) = \frac{k(0,2z + 0,5)}{z^2 - 1,2z + 0,2}$$

$$\Delta(z) = 1 + H_0 = \frac{z^2 + z(0,2k - 1,2) + 0,2 + 0,5k}{z^2 - 1,2z + 0,2} = 0$$

$$\Rightarrow z^2 + z\underbrace{(0,2k - 1,2)}_{a_1} + \underbrace{0,2 + 0,5k}_{a_0} = 0$$

$a_2 = 1 > 0$

$n = 2 \Rightarrow$ par $\longrightarrow$ 3 condiții necesare

(1) $\Delta(1) = 1 + 0,2k - 1,2 + 0,2 + 0,5k =$

$= 0,7k > 0$

$\Rightarrow k > 0$

(2) $\Delta(-1) = 1 - 0,2k + 1,2 + 0,2 + 0,5k =$

$= 2,4 + 0,3k > 0$

$\Rightarrow k > -8$

$\Rightarrow k > 0$

(3) $|a_0| < a_2$

$\Leftrightarrow -1 < 0,2 + 0,5k < 1$

$-1,2 < 0,5k < 0,8$

$-12 < 5k < 8$

$-\frac{12}{5} < k < \frac{8}{5}$

$\Rightarrow k \in \left(0, \frac{8}{5}\right)$

	z^0	z^1	z^2
1	$0,2 + 0,5k$	$0,2k - 1,2$	1
2	1	$0,2k - 1,2$	$0,2 + 0,5k$

7/6 Laboratorul 3

$A(z) = z^3 - 2z^2 + 1,4z - 0,1$

$a_3 = 1 > 0$

$n = 3 \rightarrow$ impar $\longrightarrow$ 4 condiții necesare

(1) $A(1) = 1 - 2 + 1,4 - 0,1 = 0,3 > 0$

(2) $A(-1) = -1 - 2 - 1,4 - 0,1 = -4,5 < 0$

(3) $|a_0| < a_3 \Leftrightarrow 0,1 < 1$

Matricea Jury

	z^0	z^1	z^2	z^3
1	$-0,1$	$1,4$	-2	1
2	1	-2	$1,4$	$-0,1$
3	$-0,99$	$0,6$	$-1,2$	$-$
4	$-1,2$	$0,6$	$-0,99$	$-$

$$b_0 = \begin{vmatrix} -0,1 & 1 \\ 1 & -0,1 \end{vmatrix} = -0,99$$

$$b_1 = \begin{vmatrix} -0,1 & -2 \\ 1 & 1,4 \end{vmatrix} = -1,4 + 2 = 0,6$$

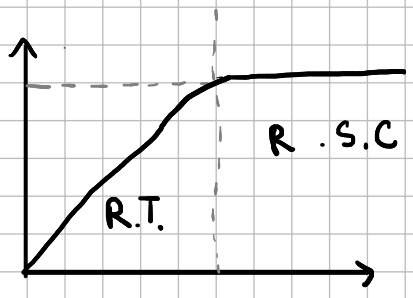
$$b_2 = \begin{vmatrix} -0,1 & 1,4 \\ 1 & -2 \end{vmatrix} = 0,2 - 1,4 = -1,2$$

(4) $|b_0| > |b_2|$

$\Leftrightarrow 0,99 > 1,2$ fals

$\Rightarrow$ sistemul nu este stabil

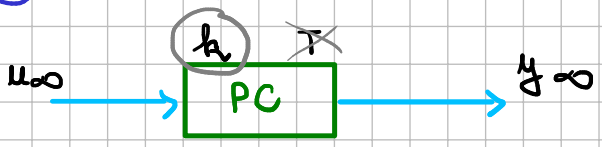
Laborator 4



R.S.C - regim stationar constant

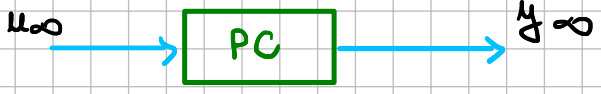
Se pune indicele ∞

1. P / PTA / PbTi



$u_\infty = const.$
$y_\infty = const.$
$\Rightarrow y_\infty = k \cdot u_\infty$

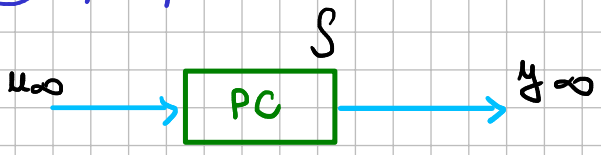
2. b / Pb



$u_\infty = const$

$y_\infty = \dot{u}_\infty = 0$

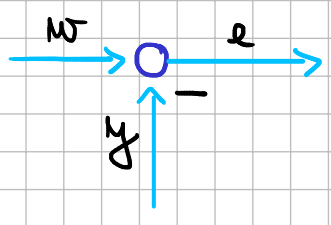
3. i / Pi / Pib



$y_\infty = const$

$y_\infty = \int \dot{u}_\infty$

$\Rightarrow u_\infty = 0$



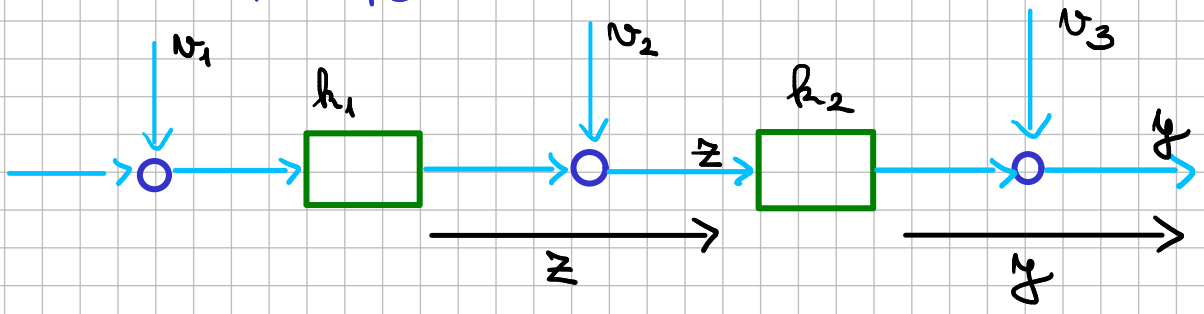
$u'_\infty = 0$
$e_\infty = 0$

$\Rightarrow e_\infty = w_\infty - y_\infty$

VRSC

$$\varepsilon_m = \frac{k_N}{1 + k_0} \qquad \varepsilon_m = 0 \ (\text{caz } 3)$$

$$k_0 = k_R \cdot k_{PC}$$



v_1: $k_N(z) = k_1$

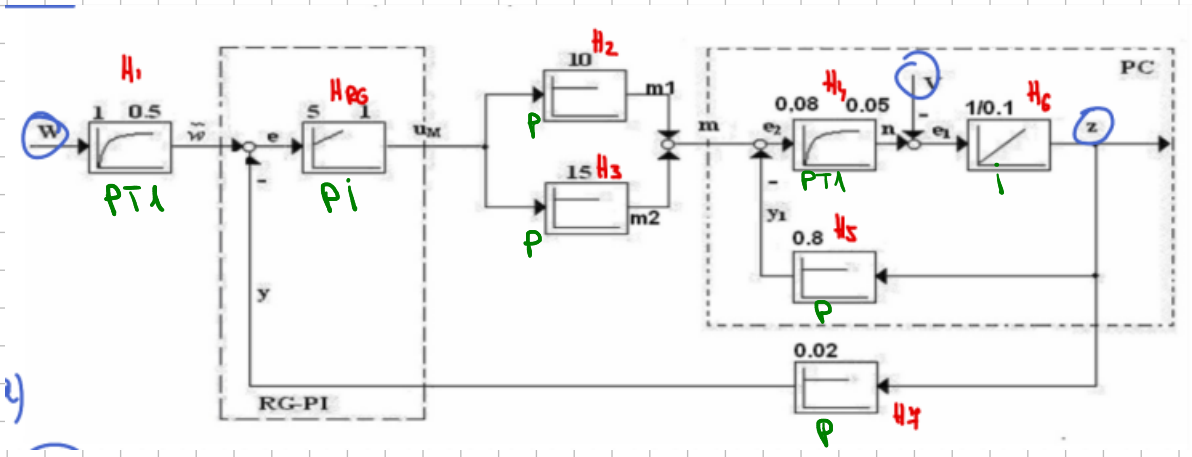
$k_N(y) = k_1 \cdot k_2$

v_2: $k_N(z) = 1$

$k_N(y) = k_2$

v_3: $k_N(y) = 1$

SC -1



II. $w_\infty = 3$, $e_\infty = 0$

în primul sumator : $w_\infty - y_\infty = e_\infty$

$\Rightarrow y_\infty = 3 - 0 = 3$

la H_7: $y_\infty = 0{,}02 \cdot z_\infty \Rightarrow z_\infty = \frac{3}{0{,}02} = 150$

la H_5 : $z_\infty \cdot 0{,}8 = y_{1\infty} \Rightarrow y_{1\infty} = 150 \cdot 0{,}8 = 120$

la H_6 : știm z_∞
bloc integrator (i) $\Rightarrow$ intrarea $e_{1\infty} = 0$

în al 4-lea sumator : $n_\infty - v_\infty = e_{1\infty}$

$n_\infty = e_{1\infty} + v_\infty = 0 + 0 = 0$

la H_4: $n = 0{,}08 \cdot e_{2\infty} \Rightarrow e_{2\infty} = \frac{0}{0{,}08} = 0$

în al treilea sumator : $m_\infty - y_{1\infty} = e_{2\infty}$

$m_\infty = y_{1\infty} + e_{2\infty} = 120 + 0 = 120$

la H_2 : $m_{1\infty} = 10 \cdot u_{m\infty}$

la H_3 : $m_{2\infty} = 15 \cdot u_{m\infty}$

dar în al doilea sumator (blocuri paralel) :

$m_{1\infty} + m_{2\infty} = m_\infty = 120$

$\Rightarrow 25\, u_{m\infty} = 120$

$\Rightarrow u_{m\infty} = 4{,}8$

$m_{1\infty} = 48$

$m_{2\infty} = 72$