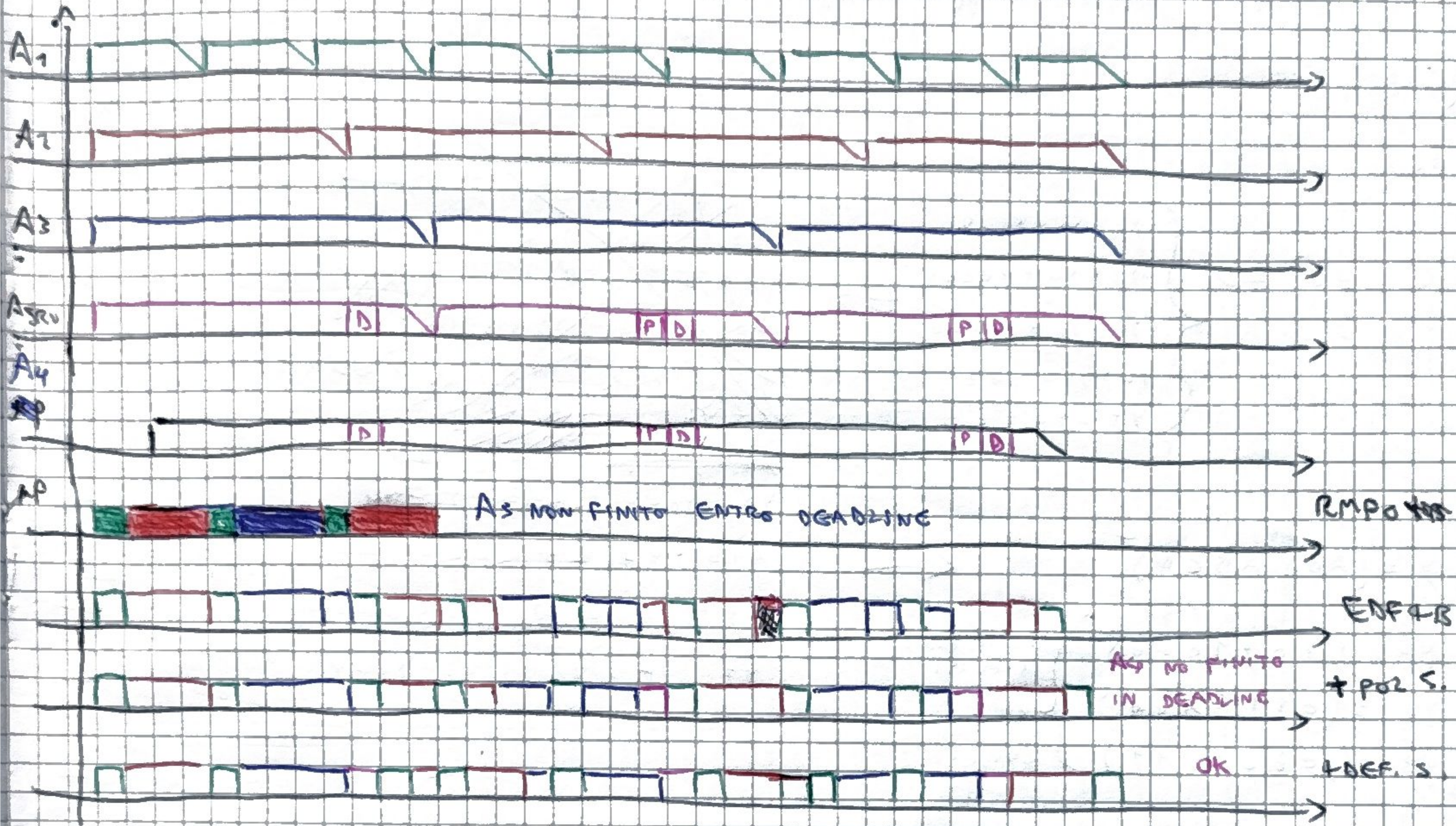
$T_1 = 4$, $C_1 = 1$ | $T_2 = 9$, $C_2 = 3$ | $T_3 = 12$, $C_3 = 4$ | $A_4 = 2$, $d_4 = 30$, $C_4 = 3$

$U = 0,916 > U_{LSA} = 0,78$ NON GARANTITO

$T_{SRV} = 12$, $C = 1$

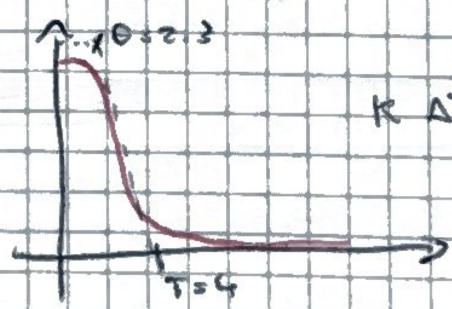
$P = 0,08\bar{3}$

PRIORITÀ: $A_1 = 0,25$, $A_2 = 0,\bar{1}$, $A_3 = 0,08\bar{3}$



TARARE GUADAGNI, DATO GRAFICO (5/7 pr) ANDAMENTO AD ANELLO APERTO CON $\Delta T = -8°C$, SCEGLIERE REGOLATORE + T PER PORTARE TEMP. A REGIME AL VALORE COMANDATO TENENDO GUADAGNI IN MODO DA AVERE COMPORTAMENTO TRANSITORIO SODDISFACENTE.

PROCESSO ASINTOT. STABILE AD ANELLO APERTO CON REGIME PERMANENTE IN RISPOSTA A INGRESSO A GRADINO, QUINDI NO POLO ORIGINE, PER AVERE SIST. CONTR. ANELLO CHIUSO TIPO 1 INTRODUCO AZIONE INTEGRALE ⇝ $P_I(s) = K_p + \frac{K_i}{s}$



$K \Delta T = K \cdot -8 = -K\,8 = -2$

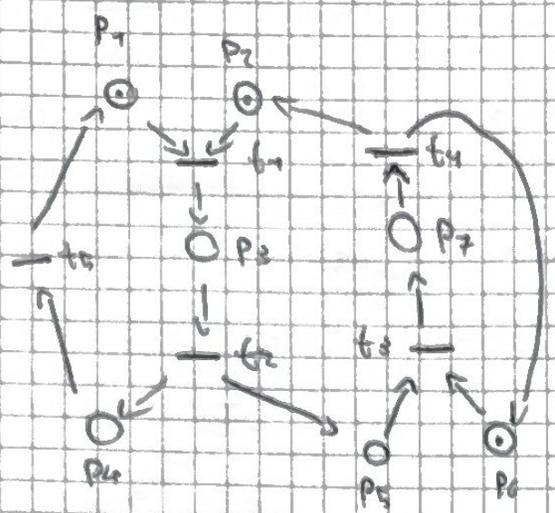
$K = 0,25$

DAL GRAFICO

CON ZIEGLER-NICHOLS

$K_p K = 0.9 \frac{T}{\theta} \Rightarrow K_p = 6.26$ | $T_i = 3.33\theta = 7.659$ | $K_i = \frac{K_p}{T_i} = 0.8176$

③



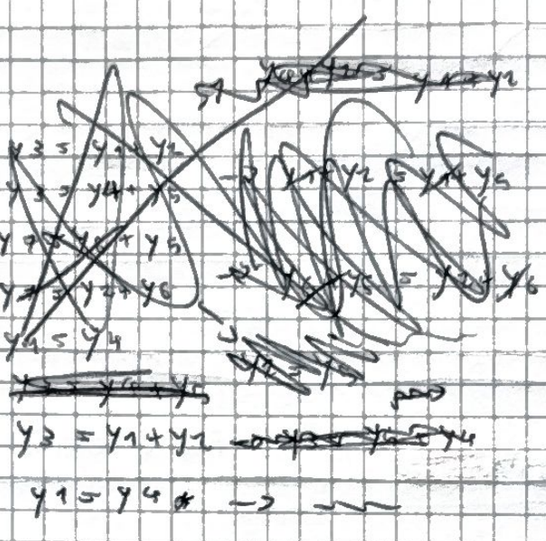
$$x_0 = \begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 1 \\ 0 \end{pmatrix}$$

$$C = \begin{pmatrix} -1 & 0 & 0 & 0 & 1 \\ -1 & 0 & 0 & 1 & 0 \\ 1 & -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & -1 \\ 0 & 1 & -1 & 0 & 0 \\ 0 & 0 & -1 & 1 & 0 \\ 0 & 0 & 1 & -1 & 0 \end{pmatrix}$$

(GRAFO MARCATO)

P-INV

$$C^T y = 0^T \Rightarrow \begin{cases} -y_1 - y_2 + y_3 = 0 \\ -y_3 + y_4 + y_5 = 0 \\ -y_5 - y_6 + y_7 = 0 \\ y_2 + y_6 - y_7 = 0 \\ y_1 - y_4 = 0 \end{cases} \Rightarrow$$



$y_3 = y_1 + y_2$

$y_1 = y_4$ → ~~

$y_7 = y_2 + y_6$ → $y_5 = y_2$

$y_7 = y_5 + y_6$ → $y_7 = y_2 + y_6$

$$y = (AB \overset{AND}{\vee} ABC)^T \leftarrow$$

$y_1 = (1\,0\,1\,1\,0\,0\,0)$ — TUTTI POSTI COPERTI

$y_2 = (0\,1\,1\,0\,1\,0\,1)$ — RETE

$y_3 = (0\,0\,0\,0\,0\,1\,1)$ — CONSERV.

T-INV

$$C\Pi = 0 \rightarrow \begin{cases} -\Pi_1 + \Pi_4 = 0 \\ -\Pi_4 + \Pi_5 = 0 \\ \Pi_1 - \Pi_2 = 0 \\ \Pi_2 - \Pi_5 = 0 \\ \Pi_2 - \Pi_3 = 0 \\ -\Pi_3 + \Pi_4 = 0 \\ \Pi_3 - \Pi_4 = 0 \end{cases} \Rightarrow \begin{matrix} \Pi_1 = \Pi_4 \\ \Pi_1 = \Pi_5 \\ \Pi_1 = \Pi_2 \\ \Pi_2 = \Pi_5 \\ \Pi_2 = \Pi_3 \\ \Pi_3 = \Pi_4 \\ \Pi_3 = \Pi_4 \end{matrix}$$

$\Rightarrow$ TUTTI UGUALI $\Pi = (1\,1\,1\,1\,1)^T$

C'È REVERSIBILITÀ OGNI 5 TRANS.

AMMISSIBILI: 1,2,3,4,5

1,2,3,5,4

1,2,5,3,4

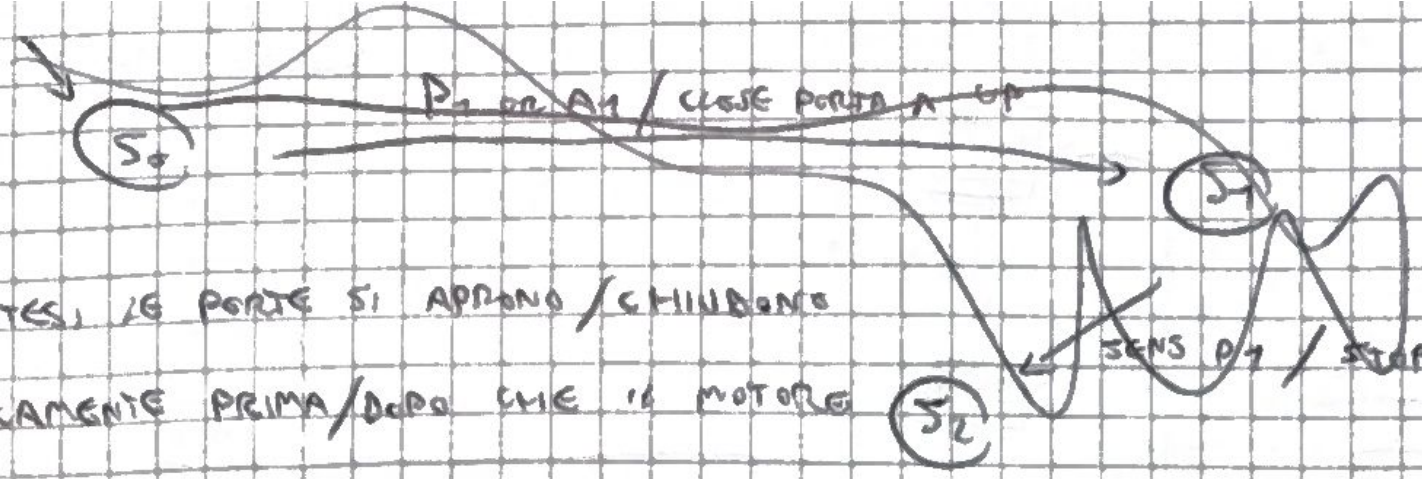
RETE VIVA E REVERSIBILE

④ ASCENSORE:

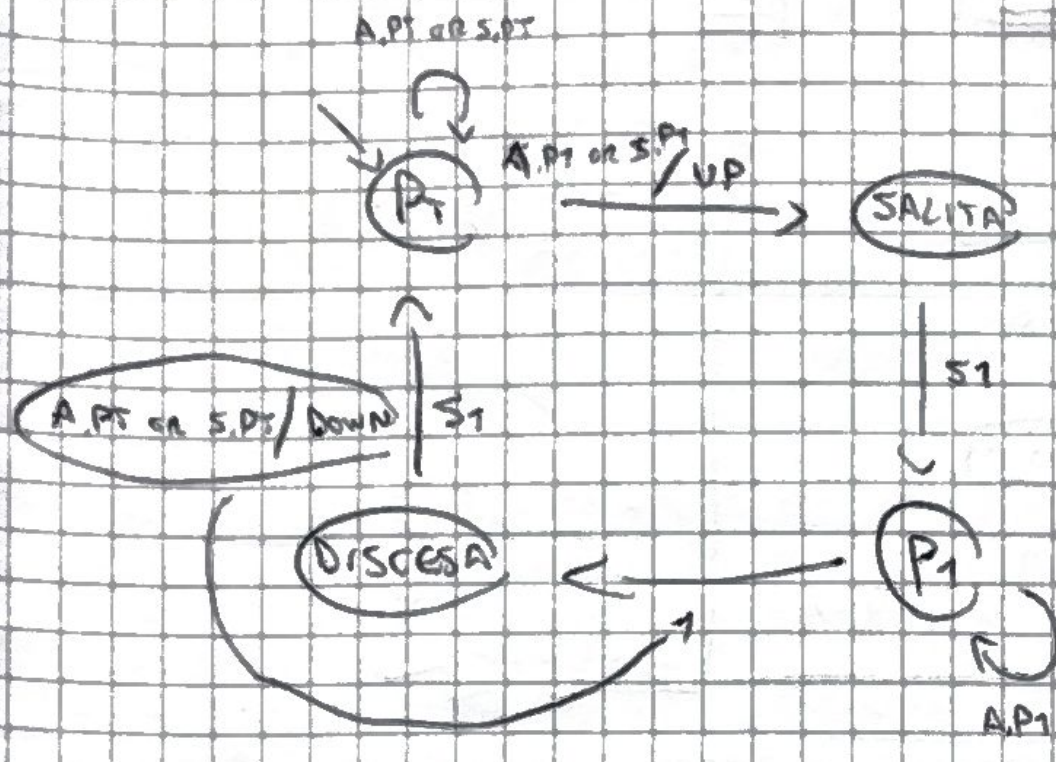
2 PULSANTI CHIAMATA (PIANO TERRA, 1°) AL PIANO E 2 NELL'ASCENSORE

2 SENSORI ARRIVO AL PIANO

MOTORE BIDIREZIONALE, PORTE (OPEN, CLOSED)



PER IPOTESI LE PORTE SI APRONO / CHIUDONO AUTOMATICAMENTE PRIMA/DOPO CHE IL MOTORE PARTA / SI FERMI



(3) DATO CHE $MAX(RA) \leq MIN(MU)$ SI PUÒ GENERALIZZARE PER 3 DISPOSITIVI

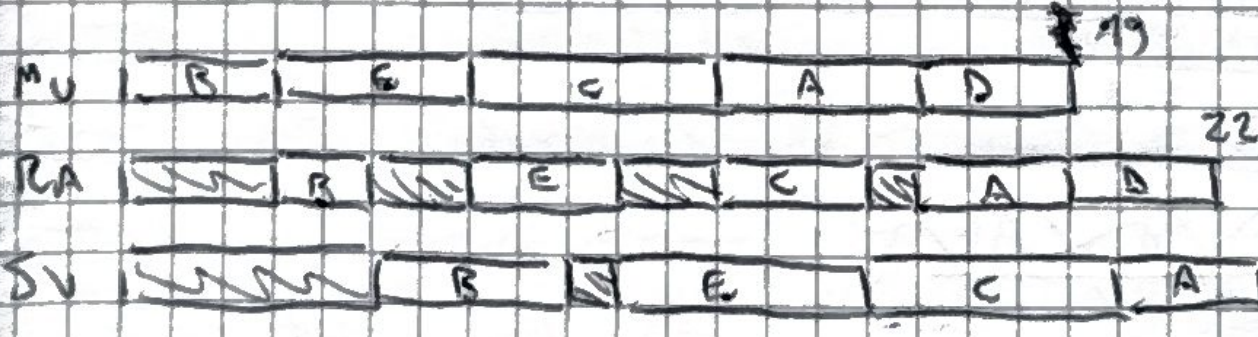
2 MACCHINE EQUIVALENTI

	A	B	C	D	E
MU+RA	7	5	8	6	7
RA+SV	6	6	8	5	8

$(t_{i1} < t_{i2})$

SET1 = {B, E} → B, E, C, A, D

SET2 = {A, C, D}



$$T_{LOW} = \sum_{i=A..E} t_{SV,i} + \min_{i=A..E}(t_{MU,i} + t_{RA,i}) \geq 19 + 5 = 24 \leq T$$