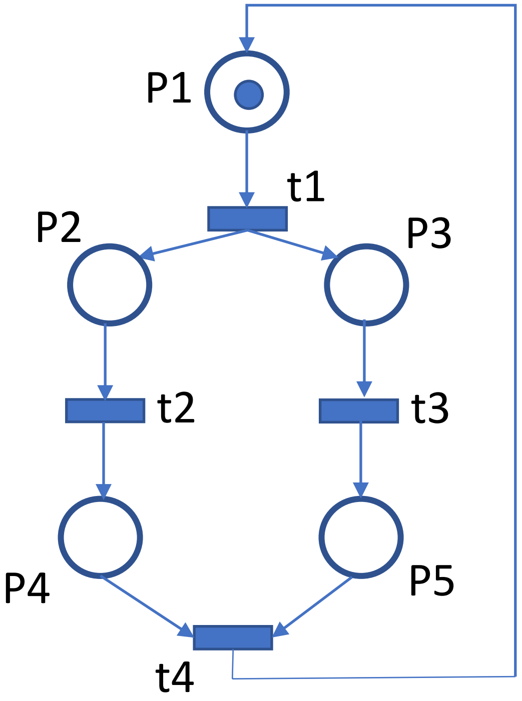
Lab 8 . Invarianti de tip P si T

Metode algebrice de analiza

Cuprins

1) Invarianti T
2) Invarianti P



$$M1 = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

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

m=5 (nr de locatii)
n=4 (nr de tranzitii)
m-rang(C)=5-3=2 !=0 => exista invarianti P
n-rang(C)=4-3=1 !=0 => exista invarianti T

Invarianti P

$\boxed{y_T * C = 0}$

$$[y1\ y2\ y3\ y4\ y5] * \begin{bmatrix} -1 & 0 & 0 & 1 \\ 1 & -1 & 0 & 0 \\ 1 & 0 & -1 & 0 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & -1 \end{bmatrix} = 0$$

$$\begin{cases} -y1+y2+y3=0 \\ -y2+y4=0 \\ -y3+y5=0 \\ y1-y4-y5=0 \end{cases} \Rightarrow \begin{cases} y1=y2+y3 \\ y2=y4 \\ y3=y5 \end{cases}$$

Nedeterminarea se rezolva dand valori
intregi cat mai mici,
in afara de solutia banala

$y2=y3=1$ $y1=2$ => $y4=y5=1$ => **$y= [2\ 1\ 1\ 1\ 1]^T$**

SuportY={P1, P2, P3, P4, P5} nr. de jetoane e conservativ

Verificare invariant P

Cu invariantii Y putem verifica daca o anumita stare ar fi posibila in reteaua analizata

$$Y^T * M_0 = Y^T * M_1 = ct.$$

$$\begin{pmatrix} 2 & 1 & 1 & 1 & 1 \end{pmatrix} * \begin{pmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} 2 & 1 & 1 & 1 & 1 \end{pmatrix} * \begin{pmatrix} 0 \\ 1 \\ 1 \\ 0 \\ 0 \end{pmatrix} = 2$$

$$\begin{pmatrix} 2 & 1 & 1 & 1 & 1 \end{pmatrix} * \begin{pmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} = \begin{pmatrix} 2 & 1 & 1 & 1 & 1 \end{pmatrix} * \begin{pmatrix} 1 \\ 0 \\ 1 \\ 1 \\ 0 \end{pmatrix}$$

$= > 2 \; != 3 =>$ Marcajul nu este posibil

Invarianti T

$$\boxed{C*X=0}$$

$$\begin{bmatrix} -1 & 0 & 0 & 1 \\ 1 & -1 & 0 & 0 \\ 1 & 0 & -1 & 0 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & -1 \end{bmatrix} \begin{bmatrix} x1 \\ x2 \\ x3 \\ x4 \end{bmatrix} = 0$$

$$\left\{\begin{array}{l} x1=x4 \\ x1=x2 \\ x1=x3 \\ X2=x4 \\ X3=x4 \end{array}\right. \Rightarrow x1=x2=x3=x4$$

x= [1 1 1 1]T

Nedeterminarea se rezolva dand valori intregi cat mai mici,
in afara solutiei banale (vectorul nul)

SuportX={t1,t2,t3,t4} secventa de tranzitii care ne duce sistemul in starea initiala

M0, t1, t2, t3, t4, **M0**