

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\left[\begin{array}{cccccccccccccccc}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & 0 & \mathbf{0} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & \mathbf{0} & 0 & 0 & \mathbf{0} & 0 & 0 & 0 & 0 \\
1 & -1 & 1 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \mathbf{0} & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \mathbf{0} & 0 & 0 & 0 & 0 & -1 & 1 \\
\mathbf{0} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
\end{array} \right]$$

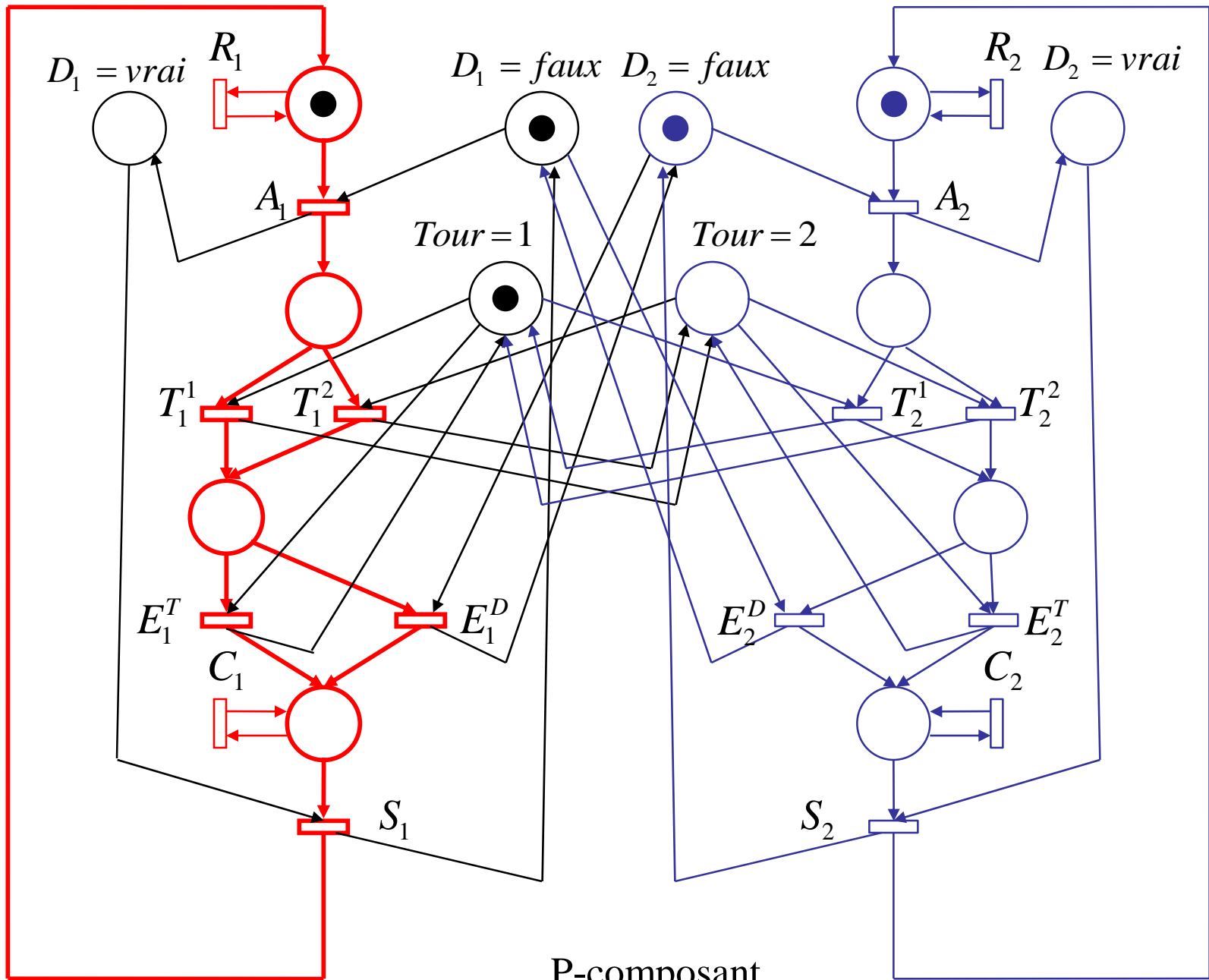
Matrice B dans l'équation d'état

$$\mathbf{v} = [0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	0	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
E_2^D	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant : $\mathbf{x}' = \mathbf{x} + \mathbf{u}B$ et $B\mathbf{v} = 0 \Rightarrow \mathbf{x}'\mathbf{v} = \mathbf{x}\mathbf{v} + \mathbf{u}B\mathbf{v} = \mathbf{x}\mathbf{v}$

Conservation de jetons (somme pondérée en général)



(Places et transitions incidentes à ces places)

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\left[\begin{array}{cccccccccccc}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & -1 & 1 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
\end{array} \right]$$

$$\begin{array}{c}
 A_1 \\
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 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \left[\begin{array}{cccccccccccccccc}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 \boxed{-1} & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 \boxed{1} & -1 & 1 & 0 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
 \end{array} \right]$$

+1

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\left[\begin{array}{cccccccccccccccc}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
\end{array} \right]$$

$$\begin{array}{c}
 A_1 \\
 T_1^1 \\
 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 1 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
 \end{bmatrix}$$

$$\begin{array}{c}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
\end{bmatrix}$$

$$\begin{array}{c}
 A_1 \\
 T_1^1 \\
 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 1 & 0 & -1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
 \end{bmatrix}$$

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A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & -1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
\end{bmatrix}$$

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 A_1 \\
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 T_1^2 \\
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 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 1 & -1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
 \end{bmatrix}$$

-1

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & -1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
\end{bmatrix}$$

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 A_1 \\
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 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 1 & -1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
 \end{bmatrix}$$

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A_1 \\
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T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
\end{bmatrix}$$

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 T_1^2 \\
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 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \left[
 \begin{array}{cccccccccccccccc}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
 \end{array}
 \right]$$

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$$\begin{array}{l}
 A_1 \\
 T_1^1 \\
 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
 \end{bmatrix}$$

$$\begin{array}{c}
 A_1 \\
 T_1^1 \\
 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
 \end{bmatrix}$$

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
\end{bmatrix}$$

$$\begin{array}{l}
 A_1 \\
 T_1^1 \\
 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 1 & 0 & 0 & -1
 \end{bmatrix}$$

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & -1
\end{bmatrix}$$

$$\begin{array}{l}
 A_1 \\
 T_1^1 \\
 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & -1
 \end{bmatrix}$$

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & -1
\end{bmatrix}$$

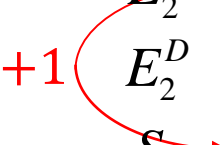
$$\begin{array}{l}
 A_1 \\
 T_1^1 \\
 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & -1
 \end{bmatrix}$$

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1
\end{bmatrix}$$


$$\begin{array}{l}
 A_1 \\
 T_1^1 \\
 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1
 \end{bmatrix}$$

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1
\end{bmatrix}$$

$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1
\end{bmatrix}$$



$$\begin{array}{l}
A_1 \\
T_1^1 \\
T_1^2 \\
E_1^T \\
E_1^D \\
S_1 \\
A_2 \\
T_2^1 \\
T_2^2 \\
E_2^T \\
E_2^D \\
S_2
\end{array}
\begin{bmatrix}
D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
-1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0
\end{bmatrix}$$



$$\begin{array}{l}
 A_1 \\
 T_1^1 \\
 T_1^2 \\
 E_1^T \\
 E_1^D \\
 S_1 \\
 A_2 \\
 T_2^1 \\
 T_2^2 \\
 E_2^T \\
 E_2^D \\
 S_2
 \end{array}
 \begin{bmatrix}
 D_1^F & D_1^V & p_1 & p_2 & p_3 & p_4 & T_1 & T_2 & D_2^F & D_2^V & q_1 & q_2 & q_3 & q_4 \\
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0
 \end{bmatrix}$$

Résultat de la réduction sous forme échelonnée :

$$\begin{array}{c}
 D_1^F \\
 D_1^V \\
 p_1 \\
 p_2 \\
 p_3 \\
 p_4 \\
 T_1 \\
 T_2 \\
 D_2^F \\
 D_2^V \\
 q_1 \\
 q_2 \\
 q_3 \\
 q_4
 \end{array}
 \begin{bmatrix}
 -1 & 1 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & -1 & 1 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & -1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & -1 & 1 & 0 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1 & 0 \\
 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 1
 \end{bmatrix}$$

$$\mathbf{v}_1 = [1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]^T$$

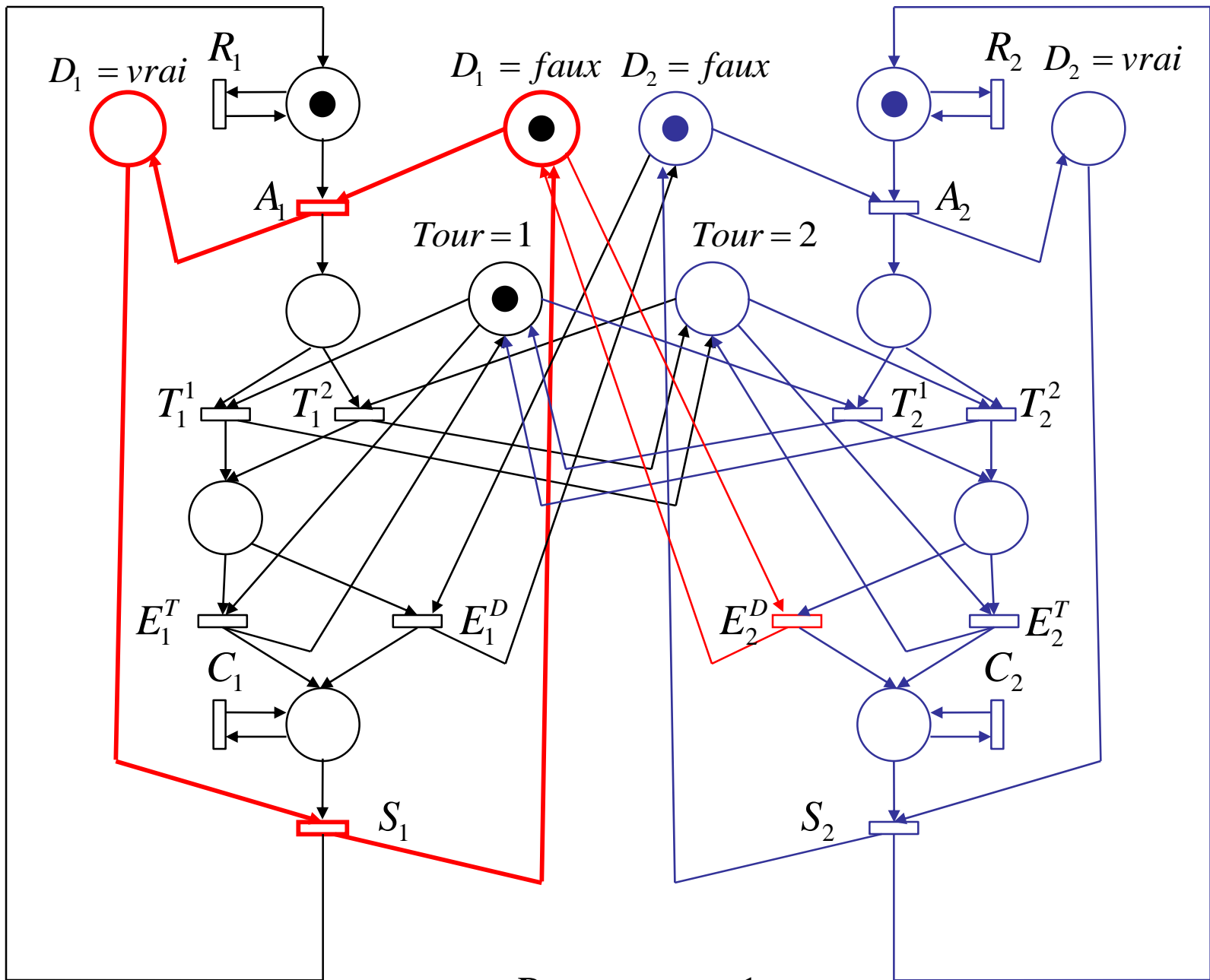
D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
0	0	0	0	-1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	-1	1

P-invariant 1

$$\mathbf{v}_1 = [1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	0	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
E_2^D	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant 1



P-component 1

$$\mathbf{v}_2 = [0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]^T$$

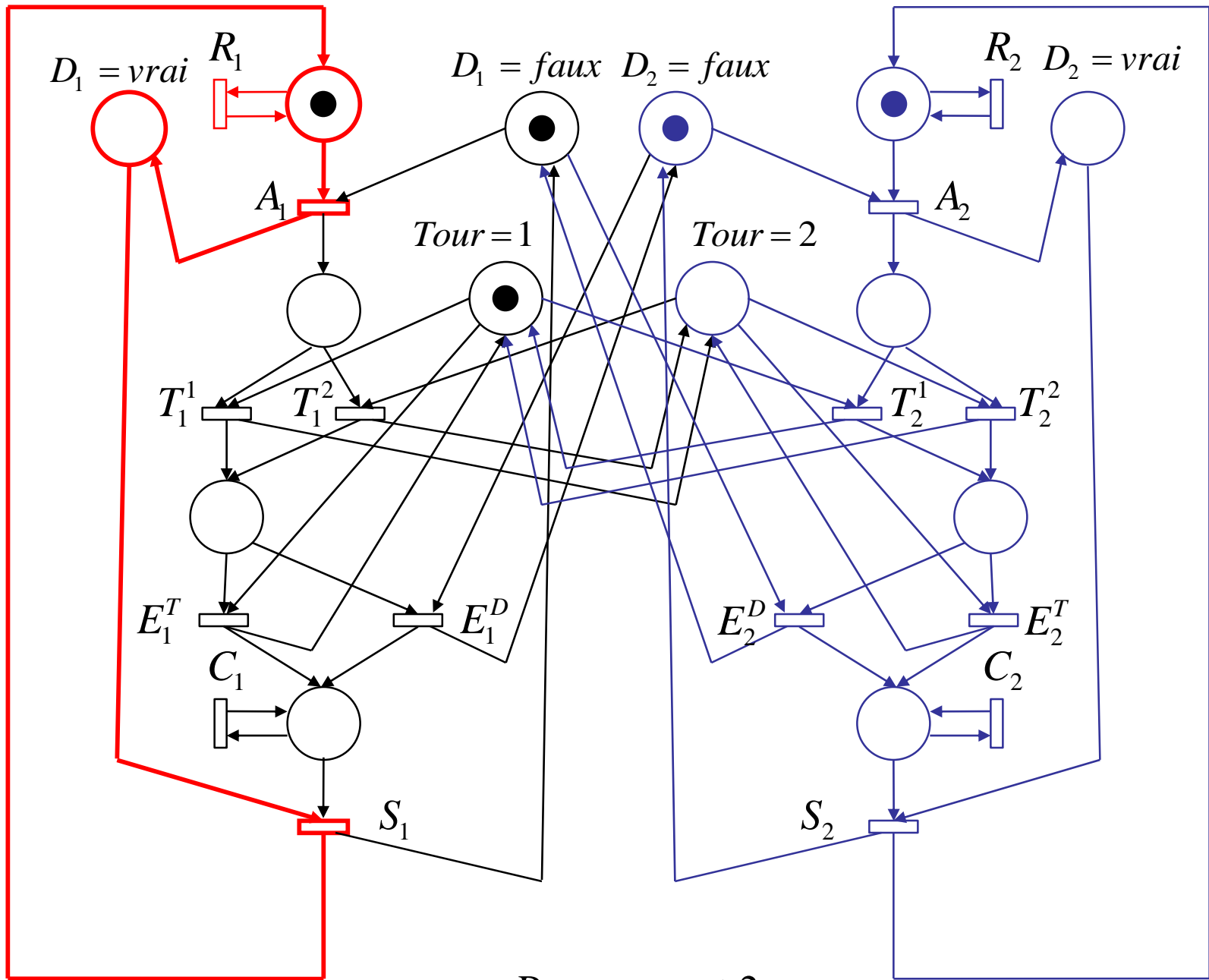
D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
0	0	0	0	-1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	-1	1

P-invariant 2

$$\mathbf{v}_2 = [0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	$\mathbf{0}$	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	$\mathbf{0}$	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	$\mathbf{0}$	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	$\mathbf{0}$	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	$\mathbf{0}$	0	0	0	0	-1	1
E_2^D	$\mathbf{0}$	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant 2



P-component 2

$$\mathbf{v}_3 = [0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0]^T$$

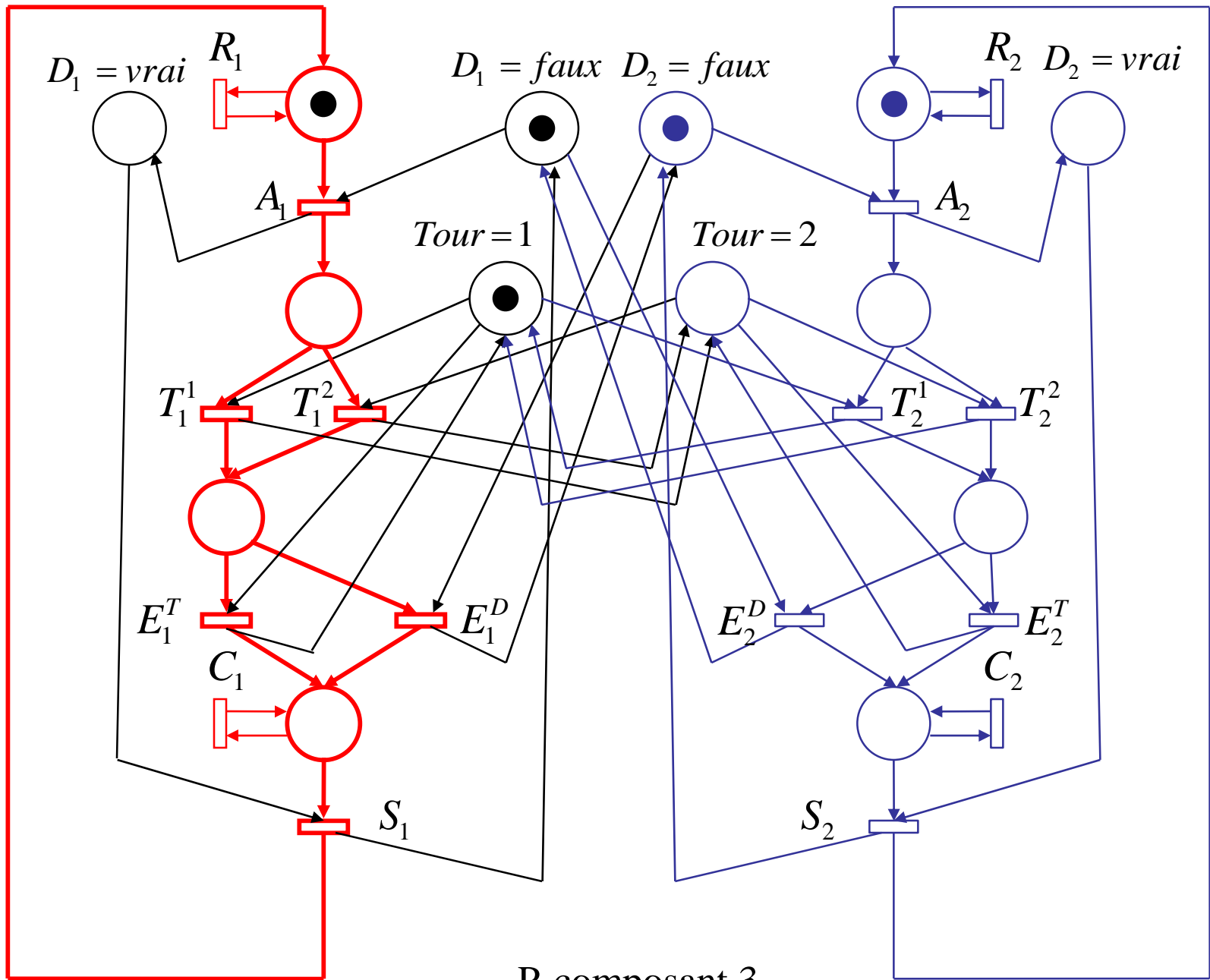
D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
0	0	0	0	-1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	-1	1

P-invariant 3

$$\mathbf{v}_3 = [0, 0, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	0	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
E_2^D	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant 3



P-composant 3

$$\mathbf{v}_4 = [1, 0, 0, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0]^T$$

D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
0	0	0	0	-1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	-1	1

P-invariant 4

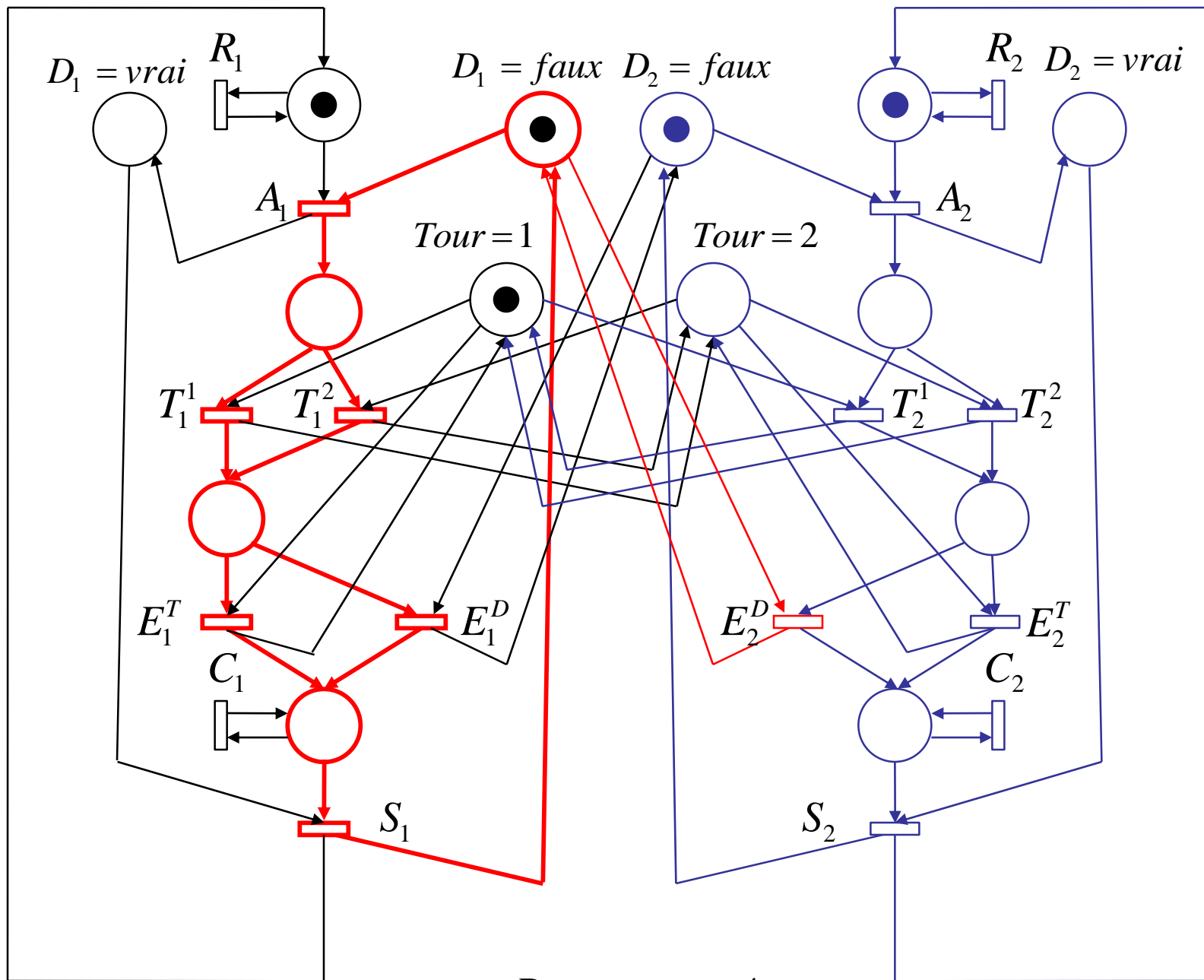
-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
0	0	0	0	-1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	-1	1

(rang 3 donc pas indépendant : $\mathbf{v}_1 + \mathbf{v}_3 = \mathbf{v}_2 + \mathbf{v}_4$) *J.-M. Delosme - ICD*

$$\mathbf{v}_4 = [1, 0, 0, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	0	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
E_2^D	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant 4



P-composant 4

$$\mathbf{v}_5 = [0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0]^T$$

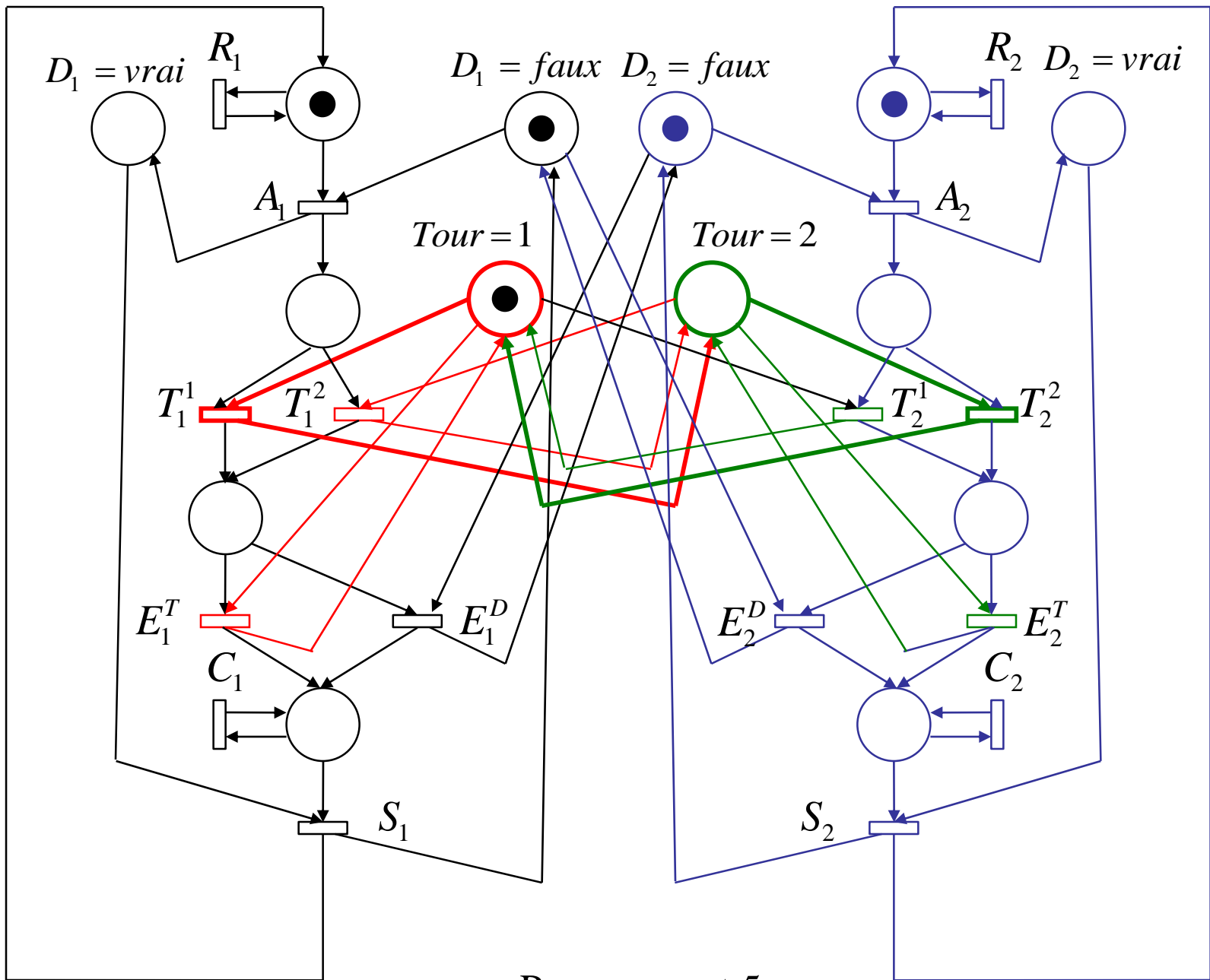
D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
0	0	0	0	-1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	-1	1

P-invariant 5

$$\mathbf{v}_5 = [0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	0	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
E_2^D	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant 5



P-composant 5

$$\mathbf{v}_6 = [0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0]^T$$

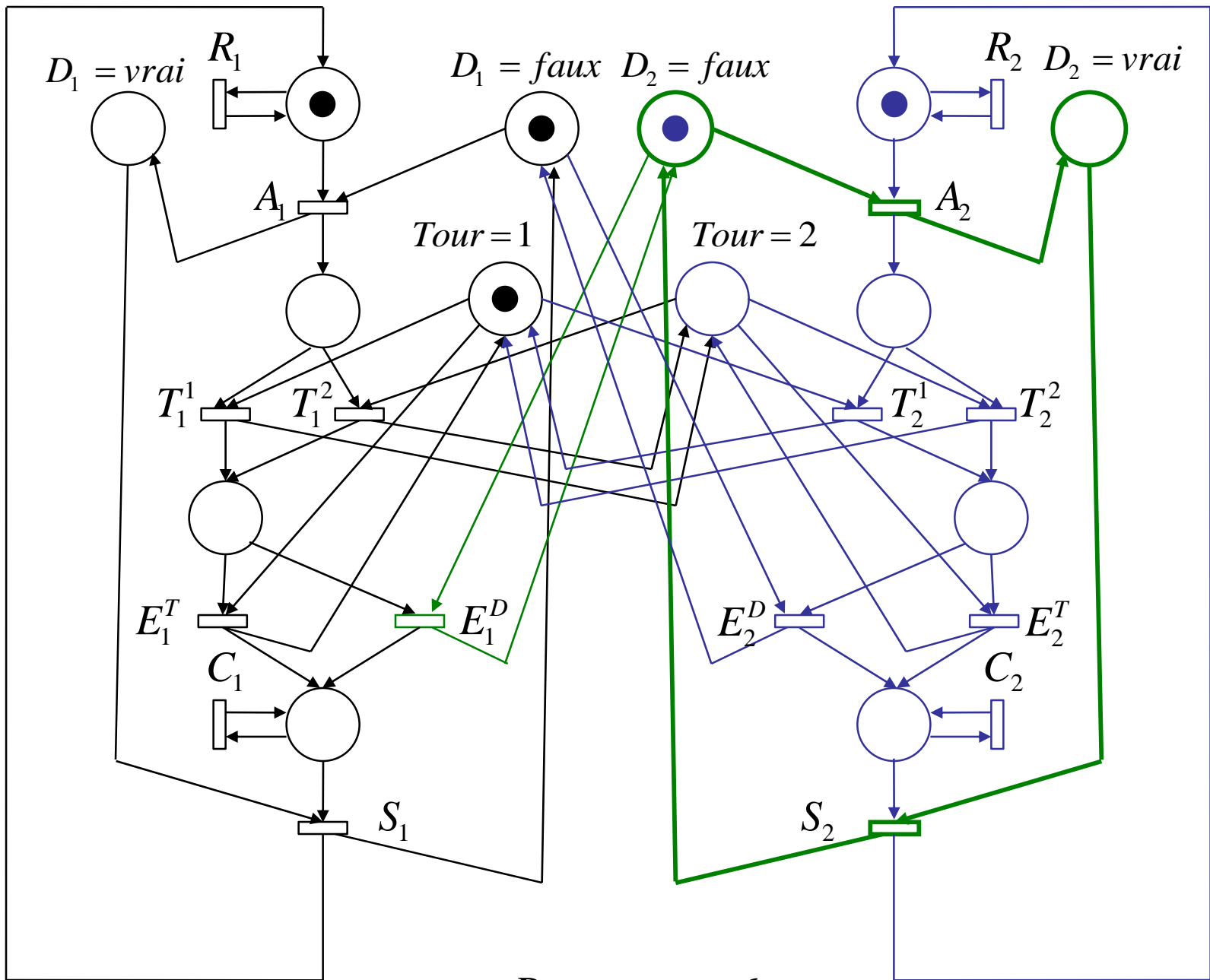
D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
0	0	0	0	-1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	-1	1

P-invariant 6

$$\mathbf{v}_6 = [0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	0	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
E_2^D	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant 6



P-composant 6

$$\mathbf{v}_7 = [0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0]^T$$

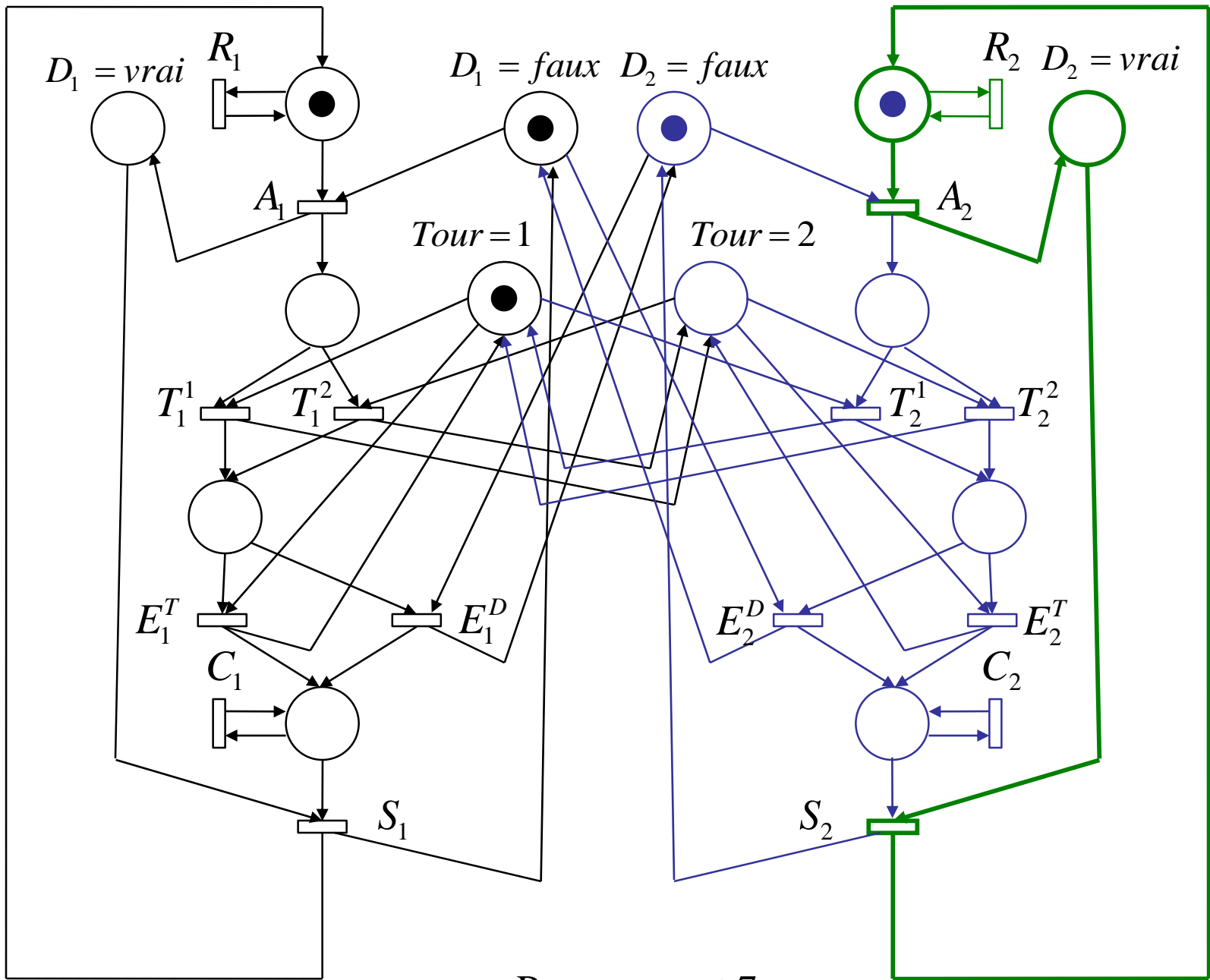
D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
0	0	0	0	-1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	-1	1

P-invariant 7

$$\mathbf{v}_7 = [0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	0	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
E_2^D	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant 7



P-composant 7

$$\mathbf{v}_8 = [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1]^T$$

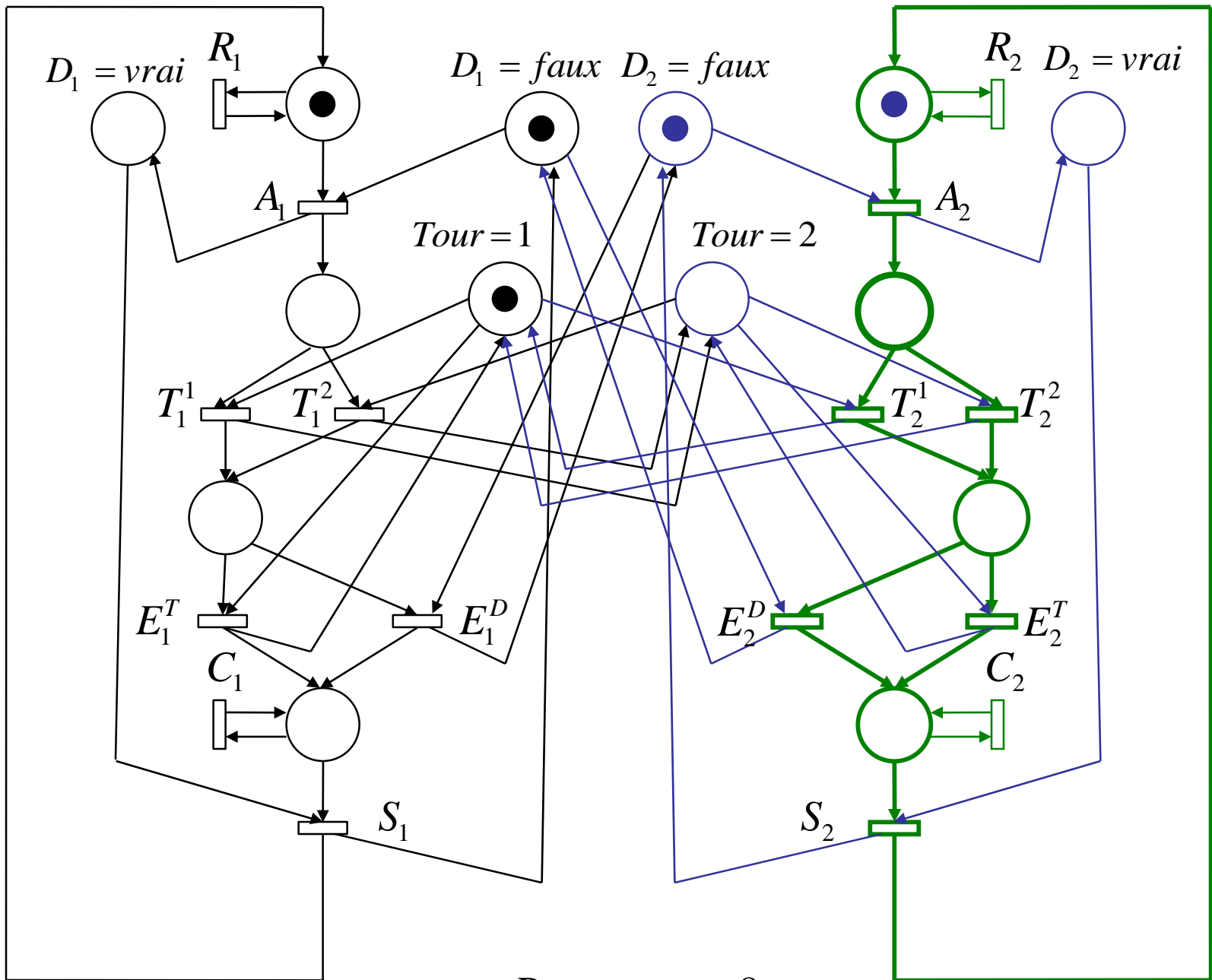
D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
0	0	0	0	-1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	-1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	-1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	-1	1

P-invariant 8

$$\mathbf{v}_8 = [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	0	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
E_2^D	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant 8



P-composant 8

$$\mathbf{v}_9 = [0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
[-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	1	-1	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
	0	0	0	0	0	0	0	0	0	0	0	0	0	1

P-invariant 9

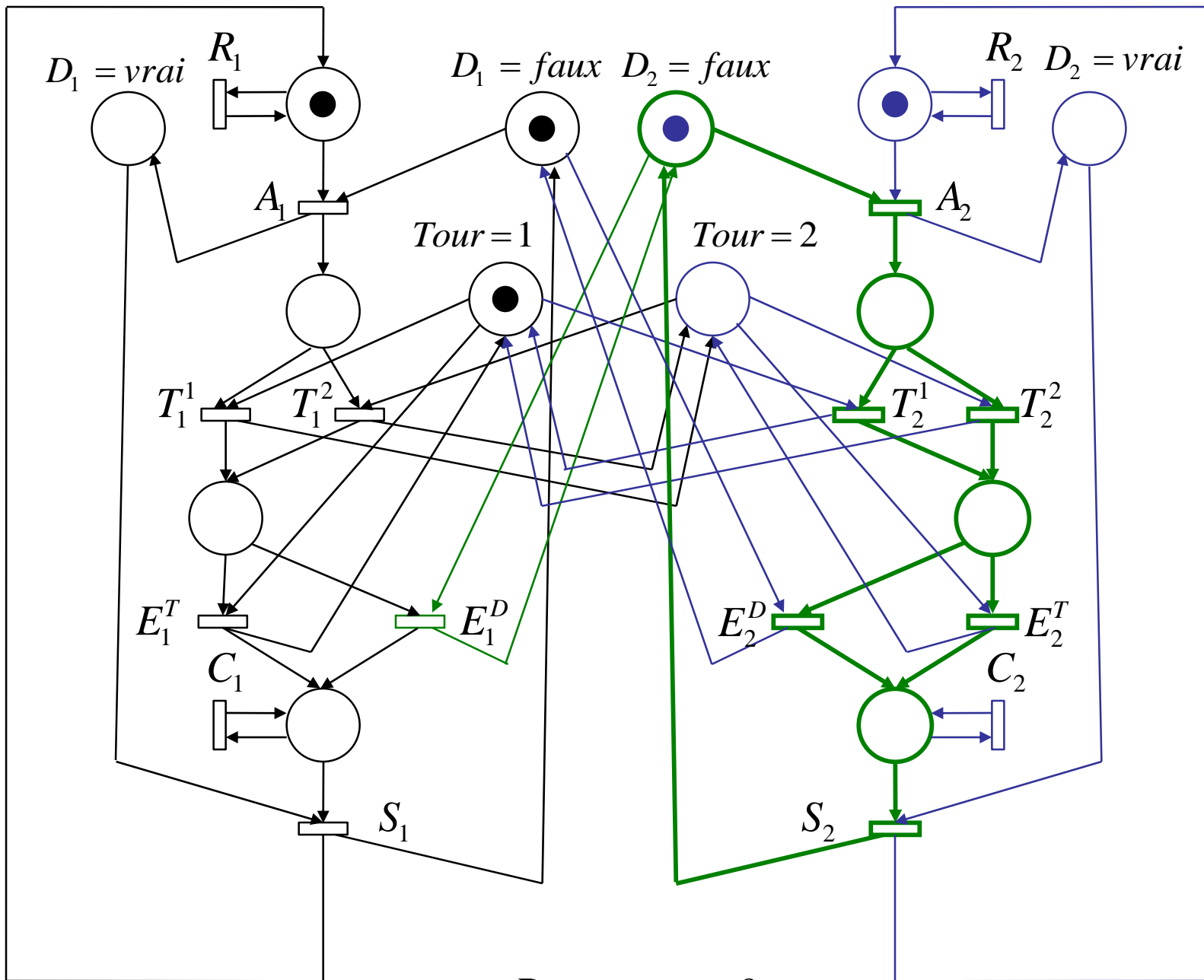
[-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	1	-1	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(rang 3 donc pas indépendant : $\mathbf{v}_6 + \mathbf{v}_8 = \mathbf{v}_7 + \mathbf{v}_9$) *J.-M. Delosme - ICD*

$$\mathbf{v}_9 = [0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1]^T$$

	D_1^F	D_1^V	p_1	p_2	p_3	p_4	T_1	T_2	D_2^F	D_2^V	q_1	q_2	q_3	q_4
A_1	-1	1	-1	1	0	0	0	0	0	0	0	0	0	0
T_1^1	0	0	0	-1	1	0	-1	1	0	0	0	0	0	0
T_1^2	0	0	0	-1	1	0	0	0	0	0	0	0	0	0
E_1^T	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
E_1^D	0	0	0	0	-1	1	0	0	0	0	0	0	0	0
S_1	1	-1	1	0	0	-1	0	0	0	0	0	0	0	0
A_2	0	0	0	0	0	0	0	0	-1	1	-1	1	0	0
T_2^1	0	0	0	0	0	0	0	0	0	0	0	-1	1	0
T_2^2	0	0	0	0	0	0	1	-1	0	0	0	-1	1	0
E_2^T	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
E_2^D	0	0	0	0	0	0	0	0	0	0	0	0	-1	1
S_2	0	0	0	0	0	0	0	0	1	-1	1	0	0	-1

P-invariant 9



P-composant 9