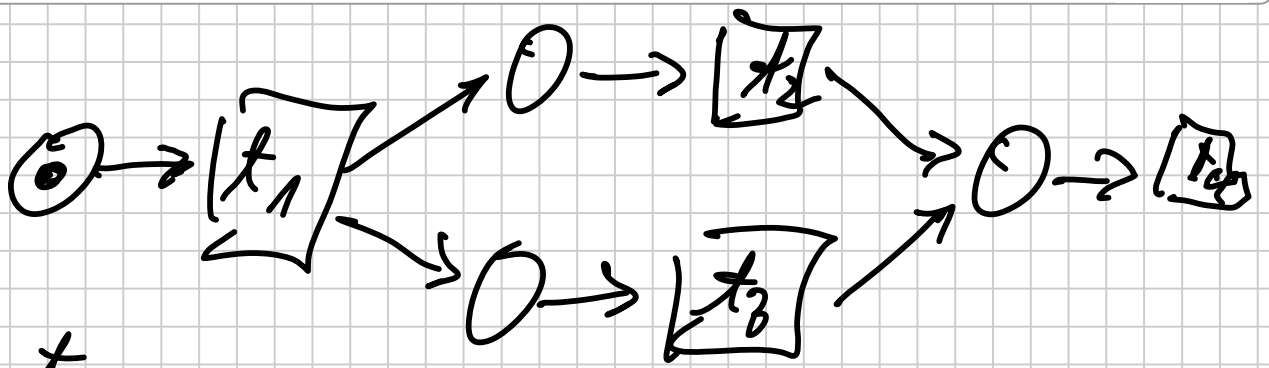
Modellierung 6.11.13

Kausalität

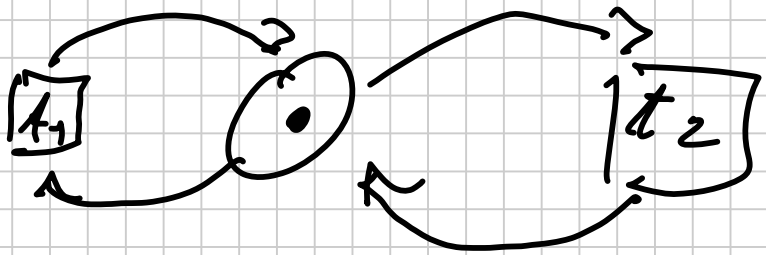


$t_1 t_2 t_4 \quad t_1 t_3 t_4$

$m_0 = (1,0,0,0)$

Transitivität der Kausalität

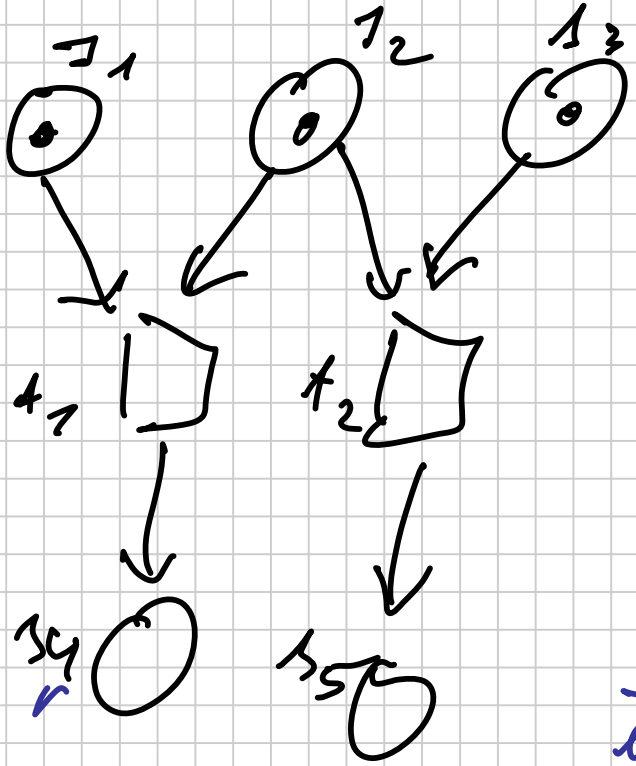
(1,1)
(0,1)
(1,0)
(0,0)
t_1
t_2
t_3
t_4
s_1
s_2
s_3
s_4
s_5



$m = (1)$ t_1 t_2

t_2 t_1

- $x_1 = 1$
- $x_2 = 1$
- $x_1 \oplus x_2 = (2) \neq (1)$



$$\vec{m} = \begin{pmatrix} 1 \\ 1 \\ 1 \\ 0 \\ 0 \end{pmatrix} \xrightarrow{t_1} \vec{m}' = \begin{pmatrix} 0 \\ 0 \\ 1 \\ 1 \\ 0 \end{pmatrix}$$

$$\vec{u} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \quad \vec{v} = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} \quad \vec{u} + \vec{v} = \begin{pmatrix} 2 \\ 3 \\ 3 \end{pmatrix}$$

$$C \cdot \vec{u} = \begin{pmatrix} c_{11} & c_{12} & c_{13} \\ c_{21} & c_{22} & c_{23} \end{pmatrix} \cdot \begin{pmatrix} u_1 \\ u_2 \\ u_3 \end{pmatrix} = \begin{pmatrix} c_{11}u_1 + c_{12}u_2 + c_{13}u_3 \\ c_{21}u_1 + c_{22}u_2 + c_{23}u_3 \end{pmatrix}$$

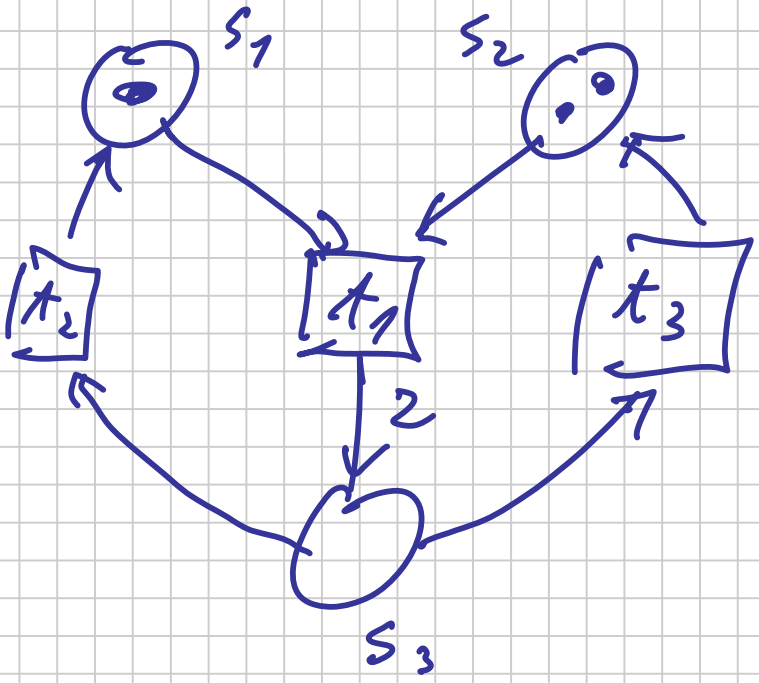
Spalten der Matrix = # Zeilen des Vektors

Ergebnis: Spaltenvektor mit # Zeilen der Matrix

$$u \cdot C = (u_1\ u_2) \cdot \begin{pmatrix} c_{11} & c_{12} & c_{13} \\ c_{21} & c_{22} & c_{23} \end{pmatrix} = \begin{pmatrix} u_1 c_{11} + u_2 c_{21}, \\ u_1 c_{12} + u_2 c_{22}, \\ u_1 c_{13} + u_2 c_{23} \end{pmatrix}$$

Spalten des Vektors = # Zeilen der Matrix

Ergebnis: Zeilenvektor mit # Spalten der Matrix



	t_1	t_2	t_3
s_1	0 - 1	1 - 0	0 - 0
s_2	0 - 1	0 - 0	1 - 0
s_3	2 - 0	0 - 1	0 - 1

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