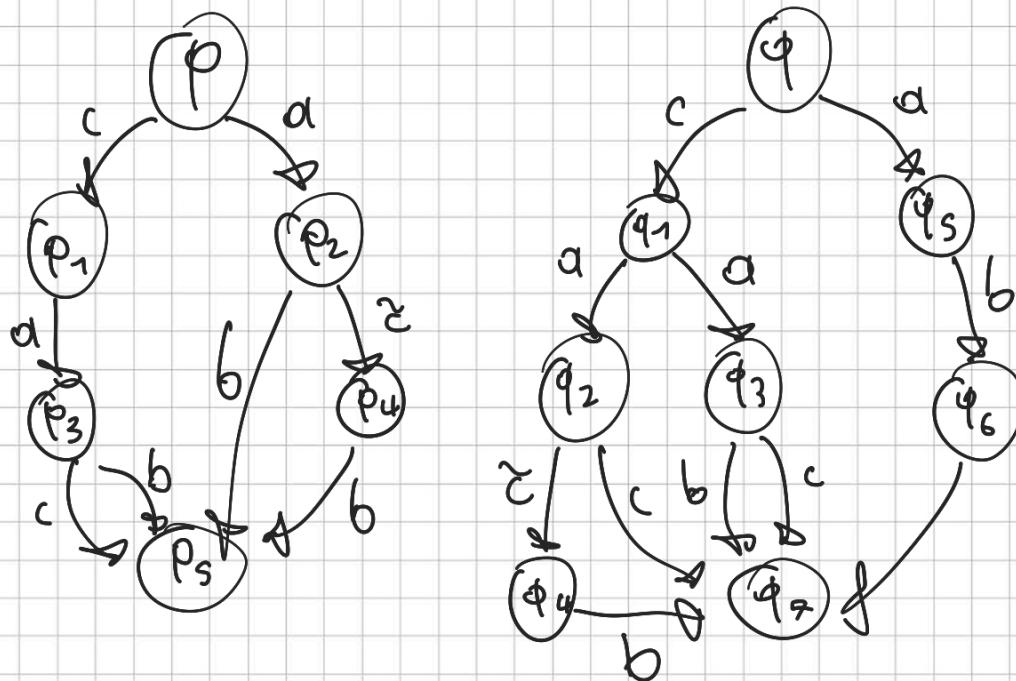


02 Feb 2017 01

$$p = c \cdot a \cdot (c \cdot n_{il} + b \cdot n_{il}) + a \cdot (b \cdot n_{il} + \tilde{c} \cdot b \cdot n_{il})$$

$$q = c \cdot (a \cdot (b \cdot n_{il} + c \cdot n_{il}) + a \cdot (c \cdot n_{il} + \tilde{c} \cdot b \cdot n_{il})) + a \cdot b \cdot n_{il}$$



$(p, q) \models p \xrightarrow{c} p_1 \quad \models q \xrightarrow{c} q_1 \quad (p_1, q_1)$

$(p_1, q_1) \models q_1 \xrightarrow{a} q_2 \quad \models p_1 \xrightarrow{a} p_3 \quad (p_3, q_2)$

$(p_3, q_2) \models q_2 \xrightarrow{\tilde{c}} q_4 \quad \models p_3 \xrightarrow{\tilde{c}} p_3 \quad (p_3, q_4)$

$(p_3, q_4) \models p_3 \xrightarrow{c} p_5 \quad \models q_4 \not\xrightarrow{c} \quad \text{A.T. VINCE}$

$p \not\sim_{bis} q$

SE  $R$  È UNA RELAZIONE DI BISIMULAZIONE DEBOLI TRA

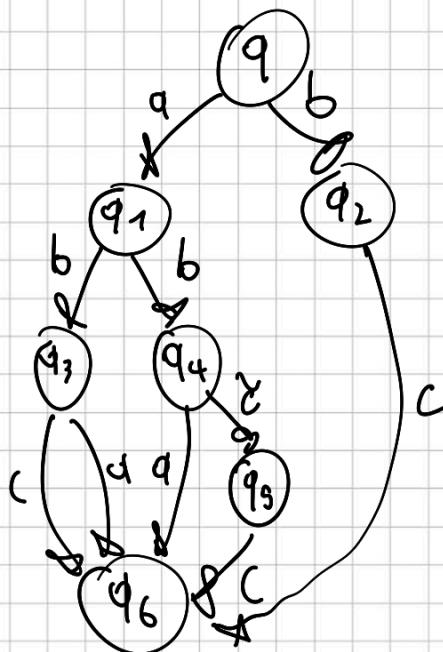
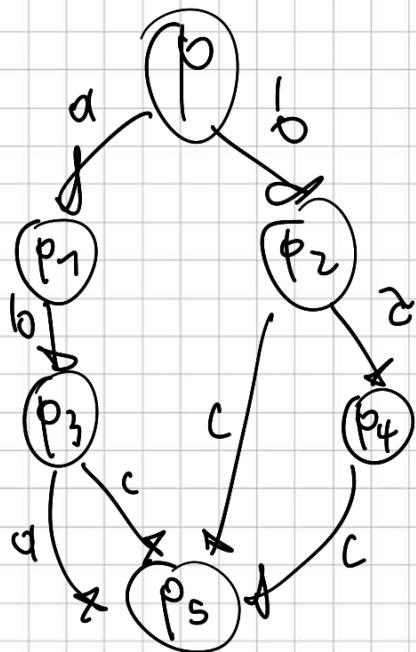
DUE PROCESSI DOVE  $\forall p, q \in \text{Proc}_{CCS}: p R q \iff \text{Act vale che}$

SE  $p \xrightarrow{a} p_1$  ALLORA  $\exists q \xrightarrow{a} q_1 \in p_1 R q_1$  E VICEVERSA

02 Feb 2019 b

$$p = q \cdot b \cdot (a \cdot \text{nil} + c \cdot \text{nic}) + b \cdot (c \cdot \text{nil} + \gamma \cdot c \cdot \text{nic})$$

$$q = a \cdot (b \cdot (c \cdot \text{nil} + a \cdot \text{nic}) + b \cdot (a \cdot \text{nil} + \gamma \cdot c \cdot \text{nic})) + b \cdot c \cdot \text{nil}$$



$$\begin{aligned}
 (p, q) &\xrightarrow{a} p \xrightarrow{b} p_1 \quad \Delta q \xrightarrow{a} q_1 \quad (p_1, q_1) \\
 (p_1, q_1) &\xrightarrow{b} q_1 \xrightarrow{c} q_4 \quad \Delta p_1 \xrightarrow{b} p_3 \quad (p_3, q_4) \\
 (p_3, q_4) &\xrightarrow{c} q_4 \xrightarrow{\gamma} q_5 \quad \Delta p_3 \xrightarrow{\gamma} p_3 \quad (p_3, q_5) \\
 (p_3, q_5) &\xrightarrow{a} p_3 \xrightarrow{a} p_5 \quad \Delta q_5 \xrightarrow{a} 
 \end{aligned}$$

$p \not\sim_{\text{BFS}} q$

Si è riferito alla simulazione parallela tra due processi

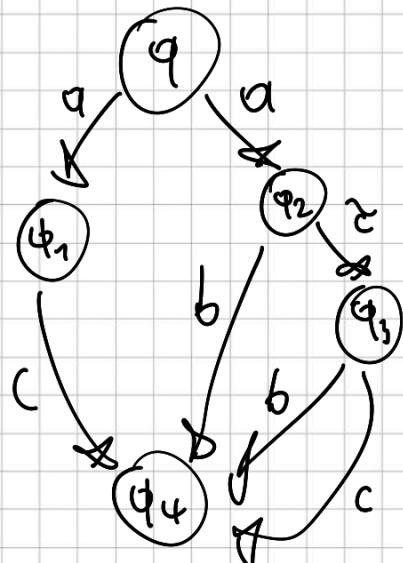
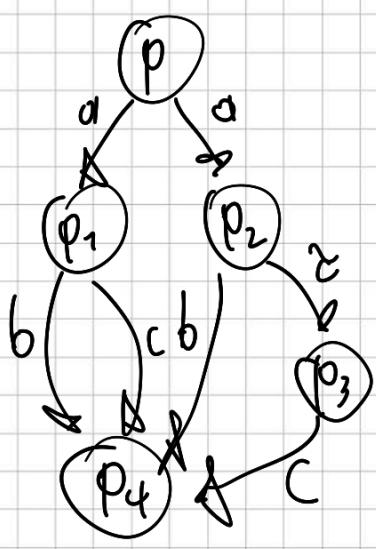
Sono  $\forall p, q \in \text{process} : p \not\sim q$   $\forall \alpha \in \text{Act value type}$

Se  $p \xrightarrow{\alpha} p_1$  allora  $\exists q \xrightarrow{\alpha} q_1 \in p_1 \sim q_1$  e viceversa

SETTEMBRE 2016

$$p = \alpha \cdot (b \cdot \text{N}ic + c \cdot \text{N}ic) + \alpha \cdot (b \cdot \text{N}ic + \gamma \cdot c \cdot \text{N}ic)$$

$$q = \alpha \cdot c \cdot \text{N}ic + \alpha \cdot (b \cdot \text{N}ic + \gamma \cdot (b \cdot \text{N}ic + c \cdot \text{N}ic))$$



$$(p, q) \xrightarrow{\alpha} p_1 \quad p_1 \xrightarrow{a} p_2 \quad p_2 \xrightarrow{a} q_1 \quad (p_2, q_1)$$

$$q_1 \xrightarrow{a} q_2 \quad (p_2, q_2)$$

$$(p_2, q_2) \xrightarrow{\gamma} p_3 \quad p_3 \xrightarrow{\gamma} q_2 \quad (p_3, q_2)$$

$$q_2 \xrightarrow{\gamma} q_3 \quad (p_3, q_3)$$

$$(p_3, q_2) \xrightarrow{c} q_3 \quad p_3 \xrightarrow{c} p_3 \quad (p_3, q_3)$$

$$(p_3, q_3) \xrightarrow{b} q_4 \quad p_3 \xrightarrow{b} \text{AN. VINCE}$$

$$(p_2, q_1) \xrightarrow{b} p_4 \quad q_1 \xrightarrow{b} \text{AN. VINCE}$$

SIA  $R$  RENDENDO SI SIMULAZIONE DIRETTE TRA DUE PROCESSI

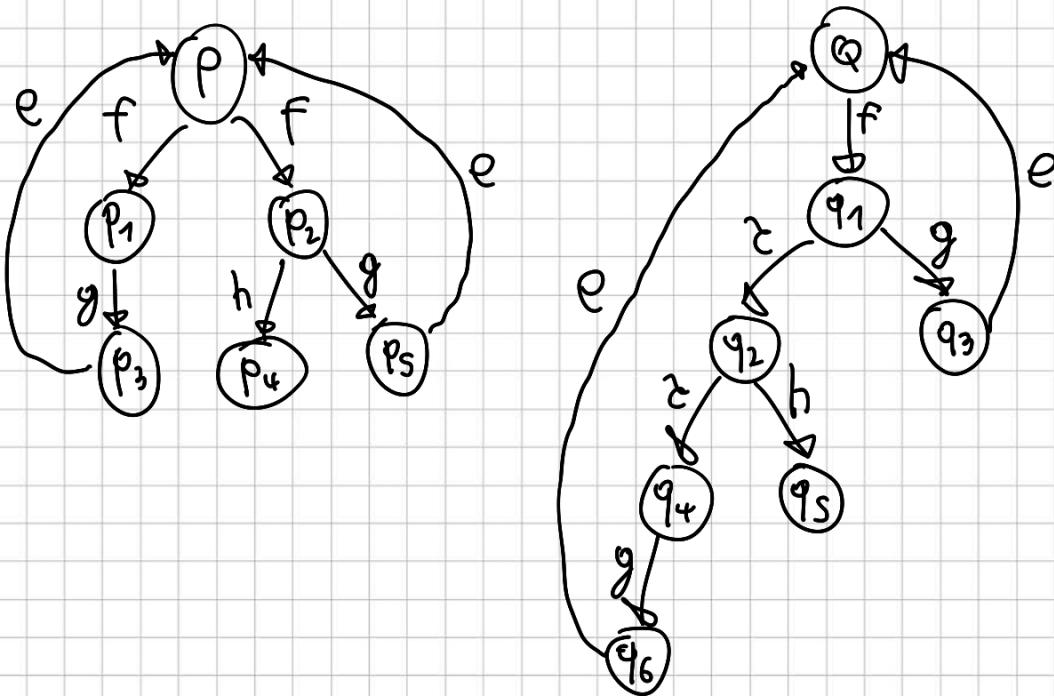
DONG  $\forall p, q \in \text{proc}_{ccs} : p R q \quad \forall \alpha \in A_C \cap \text{VALC}(A_E)$

SE  $p \xrightarrow{\alpha} p'$  ALLORA  $\exists q \xrightarrow{\alpha} q'$  CON  $p' R q'$ , E VICEVERSA

SENTRY 2021

$$P = f \cdot g \cdot e \cdot P + f \cdot (h \cdot \text{nil} + g \cdot e \cdot P)$$

$$Q = f \cdot (\tilde{e} \cdot (\tilde{e} \cdot g \cdot e \cdot Q + h \cdot \text{nil}) + g \cdot e \cdot Q)$$



$$(P, Q) \text{ AIT } Q \xrightarrow{f} q_1 \quad \text{if } f \quad P \xrightarrow{f} p_1 \quad (p_1, q_1)$$

$$P \xrightarrow{f} p_2 \quad (p_2, q_1)$$

$$(p_1, q_1) \text{ AIT } q_1 \xrightarrow{\tilde{e}} q_2 \quad \text{if } \tilde{e} \quad P_1 \xrightarrow{\tilde{e}} p_1 \quad (p_1, q_2)$$

$$(p_1, q_2) \text{ AIT } q_2 \xrightarrow{\tilde{e}} q_5 \quad \text{if } \tilde{e} \quad P_1 \xrightarrow{h} p_1 \quad \text{AII. since E}$$

$$(p_2, q_1) \text{ AIT } q_1 \xrightarrow{\tilde{e}} q_2 \quad \text{if } \tilde{e} \quad P_2 \xrightarrow{\tilde{e}} p_2 \quad (p_2, q_2)$$

$$(p_2, q_2) \text{ AIT } q_2 \xrightarrow{\tilde{e}} q_4 \quad \text{if } \tilde{e} \quad P_2 \xrightarrow{\tilde{e}} p_2 \quad (p_2, q_4)$$

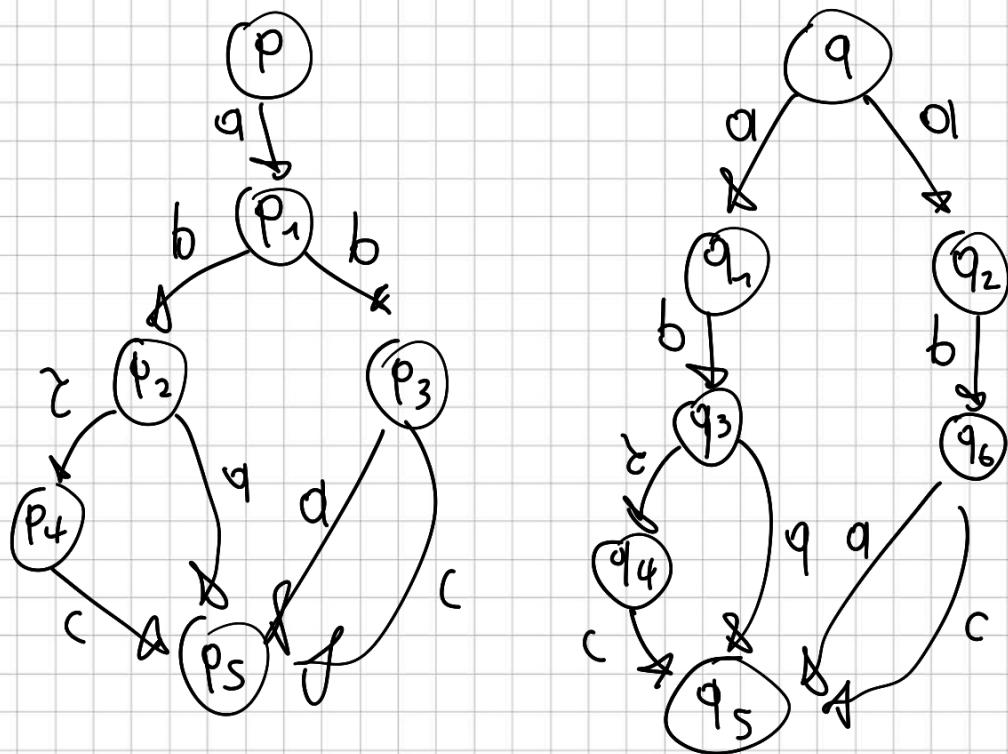
$$(p_2, q_4) \text{ AIT } p_2 \xrightarrow{h} p_4 \quad \text{if } h \quad q_4 \not\Rightarrow \text{ AII since}$$

$$P \not\approx_{SIS} Q$$

LUGURO 2016

$$p = d \cdot (b \cdot (\gamma \cdot c \cdot \text{nil} + a \cdot \text{nil}) + b \cdot (a \cdot \text{nil} + c \cdot \text{nil}))$$

$$q = a \cdot b \cdot (\gamma \cdot c \cdot \text{nil} + a \cdot \text{nil}) + a \cdot b \cdot (a \cdot \text{nil} + c \cdot \text{nil})$$



$(p, q) \text{ AN } q \xrightarrow{a} q_1 \text{ DIF } p \xrightarrow{a} p_1 \quad (p_1, q_1)$

$(p_1, q_1) \text{ AN } p_1 \xrightarrow{b} p_3 \text{ DIF } q_1 \xrightarrow{b} q_3 \quad (p_3, q_3)$   
 $q_1 \xrightarrow{b} q_4 \quad (p_3, q_4)$

$(p_3, q_3) \text{ AN } q_3 \xrightarrow{\gamma} q_4 \text{ DIF } p_3 \xrightarrow{\gamma} p_3 \quad (p_3, q_4)$

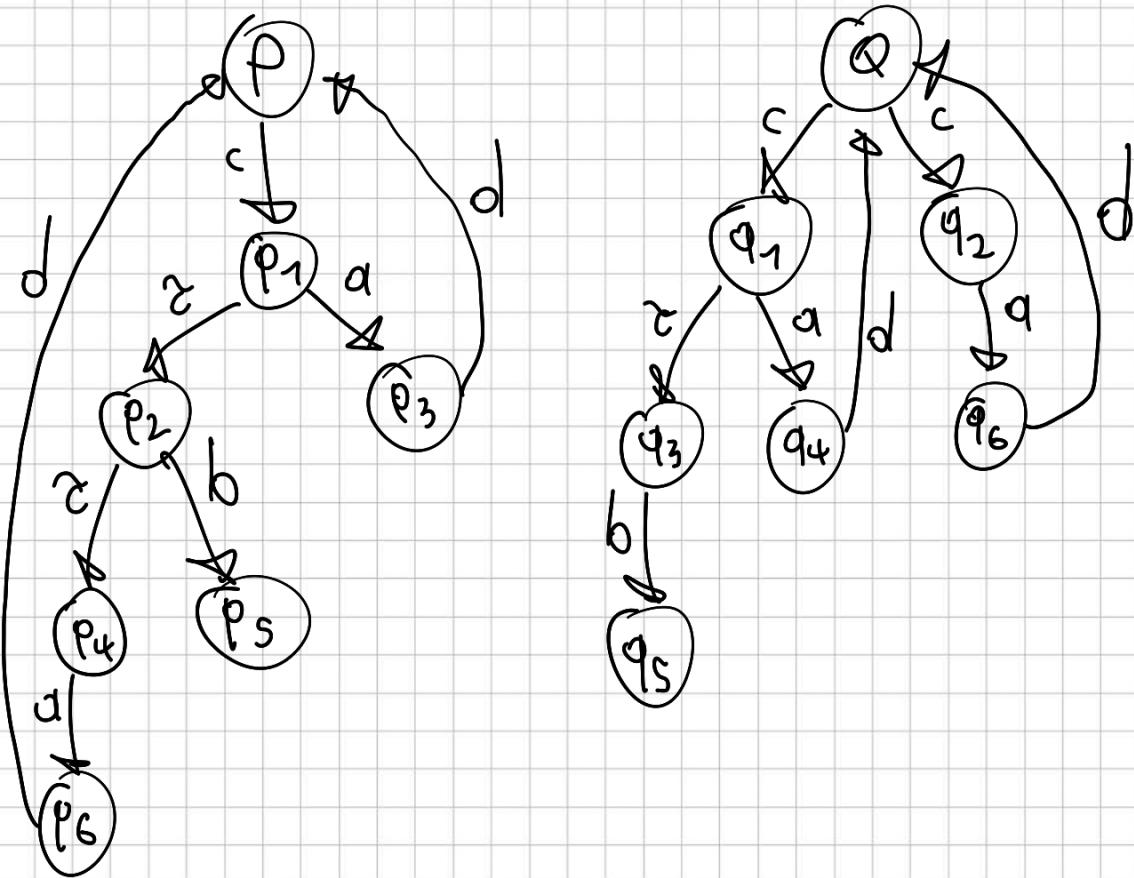
$(p_3, q_4) \text{ AN } p_3 \xrightarrow{a} p_5 \text{ DIF } q_4 \not\xrightarrow{a} \text{ AN, VINC E}$

$p \not\xrightarrow{a} q$

SETI@MBRG 2022

$$P = c \cdot (\tilde{c} \cdot (a \cdot d \cdot P + b \cdot n_{IC}) + a \cdot d \cdot P)$$

$$Q = c \cdot (\tilde{c} \cdot b \cdot n_{IC} + a \cdot d \cdot Q) + c \cdot a \cdot d \cdot Q$$



$(P, Q)$  Axt.  $Q \xrightarrow{c} q_1$  DiF  $P \xrightarrow{c} p_1 (p_1, q_1)$   
 $P \xrightarrow{c} p_2 (p_2, q_1)$

$(p_1, q_1)$  Axt.  $p_1 \xrightarrow{z} p_2$  DiF  $q_1 \xrightarrow{z} q_1 (p_2, q_1)$   
 $q_1 \xrightarrow{z} q_3 (p_2, q_3)$

$(p_2, q_1)$  Axt.  $q_1 \xrightarrow{z} q_3$  DiF  $p_2 \xrightarrow{z} p_2 (p_2, q_3)$   
 $p_2 \xrightarrow{z} p_4 (p_4, q_3)$

$(p_2, q_3)$  Axt.  $p_2 \xrightarrow{z} p_4$  DiF  $q_3 \xrightarrow{z} q_3 (p_4, q_3)$

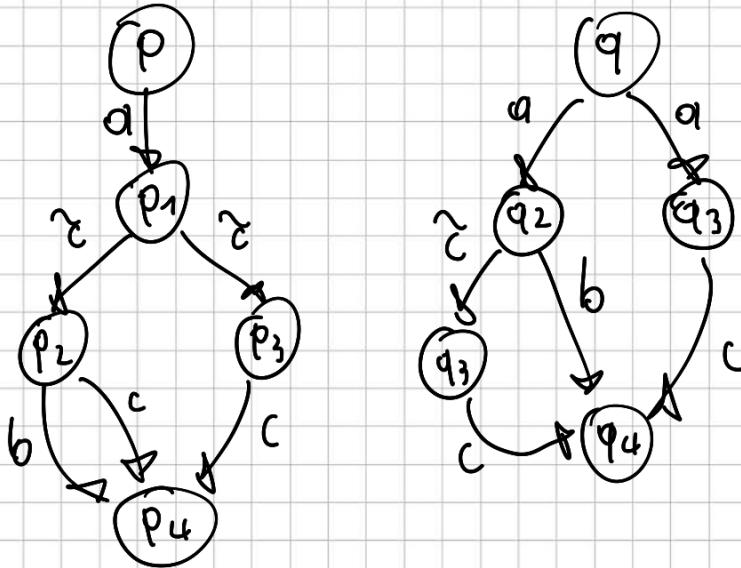
$(p_4, q_3)$  Axt.  $p_4 \xrightarrow{a} p_6$  DiF  $p_4 \xrightarrow{a} \text{Axt. Vinc}$

$P \not\propto_{\text{SIS}} Q$

MARZO 2016

$$p = q \cdot \left( \frac{c \cdot (b \cdot \text{nil} + c \cdot \text{nil})}{\underline{\underline{b \cdot \text{nil}}} + \underline{\underline{c \cdot \text{nil}}}} + \frac{c \cdot c \cdot \text{nil}}{c \cdot \text{nil}} \right)$$

$$q = \frac{q \cdot (b \cdot \text{nil} + c \cdot \text{nil})}{\underline{\underline{b \cdot \text{nil}}} + \underline{\underline{c \cdot \text{nil}}}} + \frac{q \cdot c \cdot \text{nil}}{c \cdot \text{nil}}$$



$$(p, q) \text{ AND } q \xrightarrow{a} q_2 \quad \text{NIP} \quad p \xrightarrow{a} p_1 \quad (p_1, q_2) /$$

$$p \xrightarrow{a} p_2 \quad (p_2, q_2) /$$

$$p \xrightarrow{a} p_3 \quad (p_3, q_2) /$$

$$(p_1, q_2) \text{ AND } p_1 \xrightarrow{c} p_2 \quad \text{NIP} \quad q_2 \xrightarrow{c} q_2 \quad (p_2, q_2) /$$

$$q_2 \xrightarrow{c} q_3 \quad (p_2, q_3) /$$

$$(p_2, q_2) \text{ AND } q_2 \xrightarrow{c} q_3 \quad \text{NIP} \quad p_2 \xrightarrow{c} p_2 \quad (p_2, q_3) /$$

$$(p_2, q_3) \text{ AND } p_2 \xrightarrow{b} p_4 \quad \text{NIP} \quad q_3 \xrightarrow{b} \text{AN. vinc E}$$

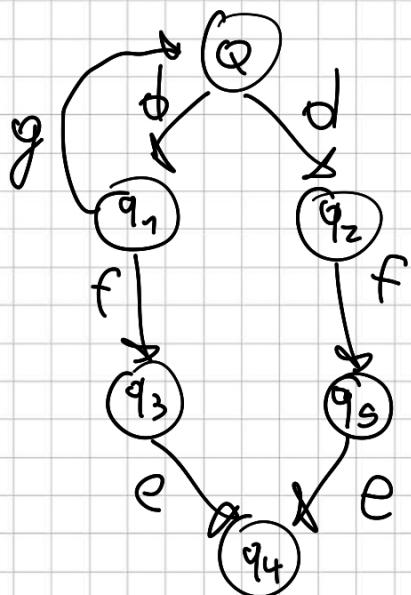
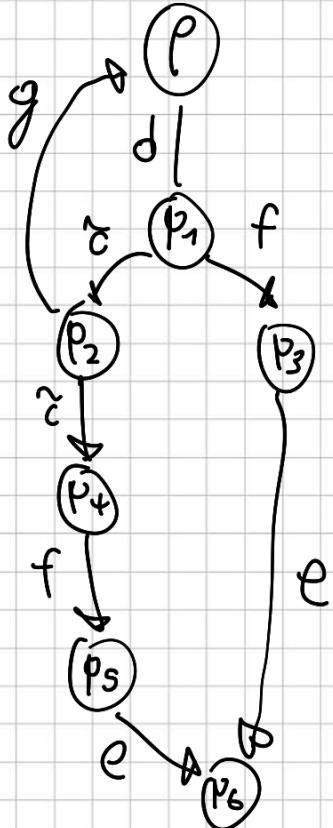
$$(p_3, q_2) \text{ AND } q_2 \xrightarrow{b} q_4 \quad \text{NIP} \quad p_3 \xrightarrow{b} \text{AN. vinc E}$$

$p \not\sim_{\text{SIS}} q$

FEBRUAR 2023

$$P = d \cdot \left( \underbrace{\gamma \left( \underbrace{\gamma \cdot f \cdot e \cdot n \cdot l + q \cdot P}_{\text{underlined}} \right)}_{\text{underlined}} \right) + f \cdot e \cdot n \cdot l$$

$$Q = d \cdot \left( \underbrace{g \cdot Q}_{\text{underlined}} + \underbrace{f \cdot e \cdot n \cdot l}_{\text{underlined}} \right) + d \cdot f \cdot e \cdot n \cdot l$$



$$(P, Q) \text{ AAT } P \xrightarrow{d} p_1 \text{ DIF } Q \xrightarrow{d} q_1 \begin{cases} (p_1, q_1) \\ (p_1, q_2) \end{cases}$$

$$(p_1, q_1) \text{ AAT } p_1 \xrightarrow{c} p_2 \text{ DIF } q_1 \xrightarrow{c} q_1 \begin{cases} (p_2, q_1) \\ (p_2, q_2) \end{cases}$$

$$(p_2, q_1) \text{ AAT } p_2 \xrightarrow{c} p_4 \text{ DIF } q_1 \xrightarrow{c} q_1 \begin{cases} (p_4, q_1) \\ (p_4, q_2) \end{cases}$$

$$(p_4, q_1) \text{ AAT } q_1 \xrightarrow{g} Q \text{ DIF } p_4 \xrightarrow{g} \text{ AAT. Viret}$$

$$(p_1, q_2) \text{ AAT } p_1 \xrightarrow{c} p_2 \text{ DIF } q_2 \xrightarrow{c} q_2 \begin{cases} (p_2, q_2) \\ (p_2, q_1) \end{cases}$$

$$(p_2, q_2) \text{ AAT } p_2 \xrightarrow{g} P \text{ DIF } q_2 \xrightarrow{g} \text{ AAT. Viret}$$

$$P \not\sim_{\text{bis}} Q$$

