

## Seminar 10

$$\begin{aligned} C_1 &= 7K \vee 7S \vee M \\ C_4 &= S \\ C_7 &= 7M \end{aligned}$$

Kernel Selection Strategy

- 1<sup>st</sup> level: the initial set of classes

$$S_0 = \{C_1, C_4, C_5\}$$

$$- S_K = \left\{ Res(C_i, C_j) \mid C_i \in S_{i-1}, C_j \in \bigcup_{\substack{i=0, j \\ i \neq j}} S_i \right\}$$

$$- S_1 = \left\{ Res(C_i, C_j) \mid C_i \in S_0, C_j \in S_0 \right\}$$

$$Res_S(C_1, C_4) = 7K \vee M = C_6$$

$$Res_M(C_1, C_5) = 7K \vee S = C_7$$

$$\Rightarrow S_1 = \{C_6, C_7\}$$

$$- S_2 = \{ \text{Res}(C_i, C_j) \mid C_i \in S_1, C_j \in S_0 \cup S_{\cancel{A}} \}$$

$$\text{Res}_m(C_6, C_5) = TK = C_7$$

$$\text{Res}_S(C_7, C_4) = TK =$$

$$S_2 = \{ C_8 \}$$

$S_3 = \emptyset \Rightarrow$  We can't reach the condition  
 $\Rightarrow$  the deletion does not help

### Deletion strategy

- most clauses are tautologies induced by another clause

Will search it here

3.  $H_1$ : May ... if Lucy ... and not Gago  
 $L \wedge T G \rightarrow M \equiv T(L \wedge T G) \vee M$   
 $= TLV G VM$

$$J \rightarrow L = T \downarrow V L$$

$$H_3; \sqrt{r_{--}} \downarrow$$

$$\sqrt{T \rightarrow J} = T \sqrt{T} V J$$

H<sub>4</sub>: TG

A5: JT

A horizontal line with a vertical tick mark at its right end.

C : M

?  $H_1, H_2, H_3, H_4, H_5 \vdash_{\text{Pao}} TC \square 2$

$C_1 = 72 \vee G \vee M$

$$C_2 = 7, \sqrt{L}$$

$$C_3 = T \sqrt{T} \sqrt{J}$$

$$C_6 = 7G$$

$$C_{15} = \sqrt{T}$$

$$C_6 = 7M$$

- We apply David Paulson  $\Rightarrow$  do not reuse anything

$$C_7 = \text{Res}_{\sqrt{T}}(C_5, C_3) = J$$

$$C_8 = \text{Res}_J(C_2, C_7) = L$$

$$C_9 = \text{Res}_L(C_8, C_1) = GVM$$

$$C_{10} = \text{Res}_G(C_9, C_5) = M$$

$$C_{11} = \text{Res}_M(C_6, C_{10}) = \square \Rightarrow \text{the condition holds}$$

Linear representation

$$u \cdot S_4 = \left\{ \begin{array}{l} c_1 \\ P_j \\ \vdash VR_j \\ \text{TP} \vee \text{TR}_j \\ c_4 \end{array} \right\} \quad \left\{ \begin{array}{l} c_2 \\ \vdash VR_j \\ \text{TP} \vee \text{TR}_j \\ c_3 \end{array} \right\}$$

$$c_2 = \vdash VR$$

$$c_3 = \text{TP} \vee \text{TR}$$

$$c_4 = \text{TP} \vee \text{TR}$$

$$c_5 = \vdash VR$$

5. 4.

$$S_4 = \{ T_2 \vee P, q \vee \neg R, R \vee \neg P \}$$

$$C_1 = T_2 \vee P$$

$$C_2 = q \vee \neg R$$

$$C_3 = R \vee \neg P$$

Linear resolution

$$C_1 = T_2 \vee P$$

$$C_2 = q \vee \neg R$$

→ 3rd  
done  
,  $C_3 = R \vee \neg P$

$\text{Res}_2(C_1, C_2)$

$$C_4 = \neg R \vee P$$

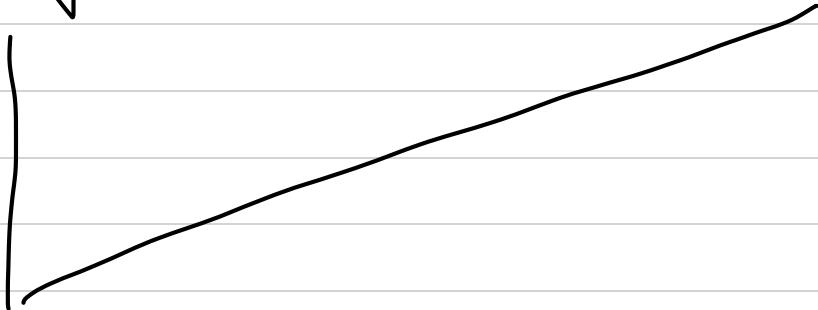
$$C_3 = R \vee \neg P$$

$\text{Res}_P(C_4, C_3)$

$$C_5 = R \vee \neg R$$

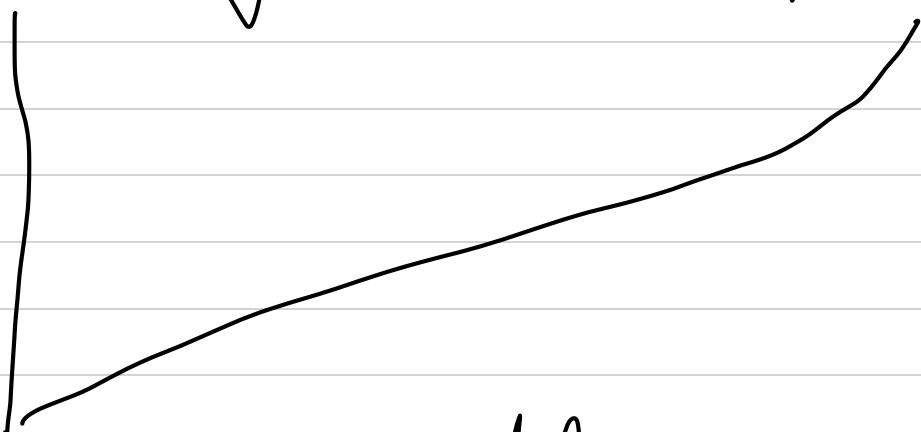
$\Rightarrow$  Tautology

$$C_1 = \gamma_f V P$$



$$C_3 = R V \gamma P$$

$$C_4 = R V \gamma g$$



$$C_2 = \gamma V \gamma R$$

$$C_5 = R V \gamma R \Rightarrow \text{tachology}$$

Since we have tried all methods, we can conclude that the set of clauses is consistent

# Locked Resolution ?

$$6. S_4 = \{ R \vee P, R \vee \neg P \vee \neg q \rightarrow q \vee \neg r, 2 \}$$

$$C_1 = (1) R \vee \overset{(2)}{P}$$

$$C_2 = (3) R \vee (4) \neg P \vee (5) \neg q$$

$$C_3 = (6) \neg q \vee (7) \neg r$$

$$C_4 = (8) q$$

$$S^0 = \{ C_1, C_2, C_3, C_4 \} . \text{saturation after } 4$$

$$C_5 = \text{Res}_{\neg q}^{\text{lock}} (C_3, C_4) = \underline{\neg P (\neg q)}$$

$$S^1 = \{ C_5 \}$$

$$C_6 = \text{Res}_R^{\text{lock}} (C_5, C_1) = \underline{P (2)}$$

$$C_7 = \text{Res}_R^{\text{lock}} (C_5, C_2) = \underline{\neg P (q) \vee (r) \neg q}$$

$$S^2 = \{C_6, C_7\}$$

$$C_8 = \text{Res}_P^{\text{Loh}} (C_6, C_7) = T_2(S)$$

$$S^3 = \{C_8\}$$

$$C_9 = \text{Res}_S^{\text{Loh}} (C_8, C_4) = \square$$

Second indexing next time