

Autonomous Intelligent Systems

Lab 1

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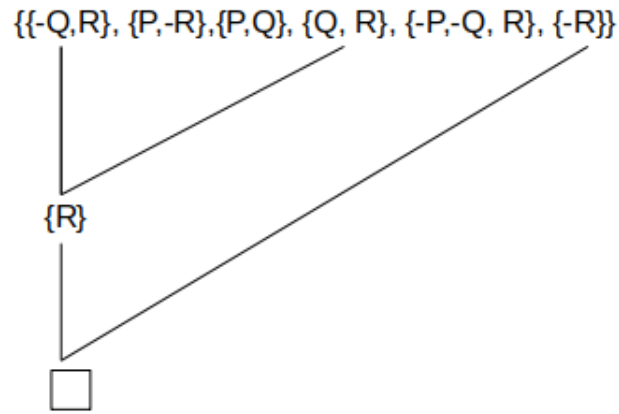
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1 Exercise 1

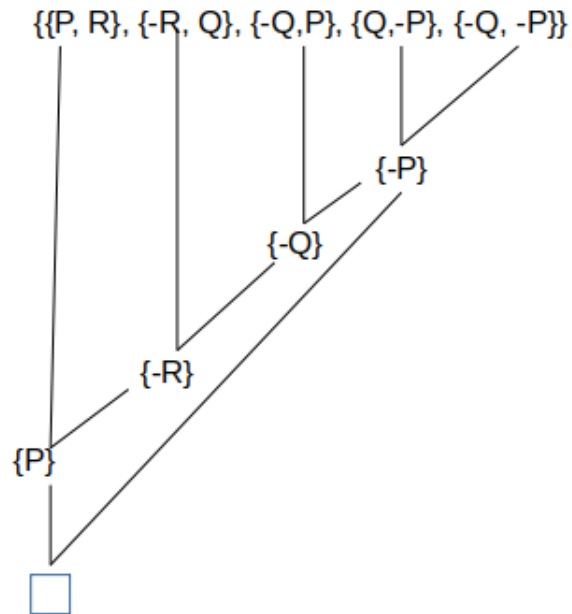
- a) $(P \vee (Q \leftrightarrow R)) \wedge \neg(Q \rightarrow R)$
 $(P \vee (Q \rightarrow R) \wedge (R \rightarrow Q)) \wedge \neg(Q \rightarrow R)$ - elimination of equivalence
 $(P \vee (\neg Q \vee R) \wedge (\neg R \vee Q)) \wedge \neg(\neg Q \vee R)$ - elimination of implication
 $(P \vee (\neg Q \vee R) \wedge (\neg R \vee Q)) \wedge (Q \wedge \neg R)$ - distribution of negative
 $(P \vee \neg Q \vee R) \wedge (P \vee \neg R \vee Q) \wedge (Q \wedge \neg R)$ - Distribution of \vee
 $(P \vee \neg Q \vee R) \wedge (P \vee \neg R \vee Q) \wedge Q \wedge \neg R$ - Removal of unnecessary brackets.
- b) $\neg(P \leftrightarrow Q) \rightarrow (Q \leftrightarrow R)$
 $\neg((P \rightarrow Q) \wedge (Q \rightarrow P)) \rightarrow (Q \rightarrow R) \wedge (R \rightarrow Q)$ - elimination of equivalence
 $\neg((\neg P \vee Q) \wedge (\neg Q \vee P)) \rightarrow (\neg Q \vee R) \wedge (\neg R \vee Q)$ - elim. of implication
 $((\neg P \vee Q) \wedge (\neg Q \vee P)) \vee ((\neg Q \vee R) \wedge (\neg R \vee Q))$ - elimination of implication
 $((\neg P \vee Q) \vee (\neg Q \vee R)) \wedge ((\neg P \vee Q) \vee (\neg R \vee Q)) \wedge ((\neg Q \vee P) \vee (\neg Q \vee R)) \wedge ((\neg Q \vee P) \vee (\neg R \vee Q))$ - Distribution over \wedge

2 Exercise 2

a) $\Delta_{\phi_1} = \{\{\neg Q, R\}, \{P, \neg R\}, \{P, Q\}, \{Q, R\}, \{\neg P, \neg Q, R\}, \{\neg R\}\}$



b) $\Delta_{\phi_2} = \{\{P, R\}, \{\neg R, Q\}, \{\neg Q, P\}, \{Q, \neg P\}, \{\neg Q, \neg P\}\}$



c) $\Delta_{\phi 3} = \{\{\neg P, R, S\}, \{\neg R, \neg Q\}, \{P, S, \neg Q\}, \{\neg S, \neg Q\}, \{\neg P, Q\}, \{P, Q\}\}$
 $\{\{-P, R, S\}, \{-R, -Q\}, \{P, S, -Q\}, \{-S, -Q\}, \{-P, Q\}, \{P, Q\}\}$

