CSED342 Assignment 8
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By turning in this assignment, I agree by the POSTECH honor code and declare that all of this is my own work.

Problem 2a

$KB = \{(A \lor B) \to \neg C, \ \neg(\neg A \lor C) \to D, \ A\}$

KB를 CNF로 전환.

- $\dfrac{(A \lor B) \to \neg C}{\neg(A \lor B) \lor \neg C}$ 이고, 이는 $\dfrac{\neg(A \lor B) \lor \neg C}{(\neg A \land \neg B) \lor \neg C}$ 이고, 이는 $\dfrac{(\neg A \land \neg B) \lor \neg C}{(\neg A \lor \neg C) \land (\neg B \lor \neg C)}$

  Distribute

- $\dfrac{\neg(\neg A \lor C) \to D}{\neg A \lor C \lor D}$

$\therefore$ KB converted to CNF : $\{(\neg A \lor \neg C) \land (\neg B \lor \neg C), \ \neg A \lor C \lor D, \ A\}$

Inference

$\{(\neg A \lor \neg C) \land (\neg B \lor \neg C), \ \neg A \lor C \lor D, \ A\} \longleftrightarrow \{A \to \neg C, \ B \to \neg C, \ A \to (\neg C \to D), \ A\}$

Modus Ponens 적용

$\dfrac{A \to \neg C, \ A}{\neg C}$ 이고 $\dfrac{A \to (\neg C \to D), \ A}{\neg C \to D}$ 이므로 $\dfrac{\neg C \to D, \ \neg C}{D}$ $\quad \therefore D$ is derived.

Problem 2b

$KB = \{A \lor B, \ B \to C, \ (A \lor C) \to D\}$

KB를 CNF로 변환

- $\dfrac{B \to C}{\neg B \lor C}$

- $\dfrac{(A \lor C) \to D}{\neg(A \lor C) \lor D}$ 이고, 이는 $\dfrac{\neg(A \lor C) \lor D}{(\neg A \land \neg C) \lor D}$ 이고, 이는 $\dfrac{(\neg A \land \neg C) \lor D}{(\neg A \lor D) \land (\neg C \lor D)}$

  Distribute

$\therefore$ KB converted to CNF : $\{A \lor B, \ \neg B \lor C, \ (\neg A \lor D) \land (\neg C \lor D)\}$

$\{A \lor B, \ \neg B \lor C, \ (\neg A \lor D) \land (\neg C \lor D)\} \longleftrightarrow \{A \lor B, \ \neg B \lor C, \ \neg A \lor D, \ \neg C \lor D\}$

Resolution 적용 $\left(\dfrac{f\vee h,\ g\vee\neg h}{f\vee g}\right)$

$$\dfrac{A\vee B,\ D\vee\neg A}{B\vee D}\ \text{이로,}\quad \dfrac{B\vee D,\ \neg B\vee C}{C\vee D}\ .$$

$$\dfrac{C\vee D,\ \neg C\vee D}{D\vee D}\ \text{이로,}\quad \dfrac{D\vee D}{D}\qquad \therefore D\ \text{is derived.}$$