

Kontrolltöö 18.10.2010
Lahendused

1.

$$\begin{aligned}
 & \neg((p \supset q) \supset r \wedge \neg s) \wedge t \\
 \Leftrightarrow & (p \supset q) \wedge \neg(r \wedge \neg s) \wedge t \\
 \Leftrightarrow & (\neg p \vee q) \wedge (\neg r \vee s) \wedge t \\
 \Leftrightarrow & (\neg p \wedge \neg r \wedge t) \vee (\neg p \wedge s \wedge t) \vee (q \wedge \neg r \wedge t) \vee (q \wedge s \wedge t)
 \end{aligned}$$

2. $(p \vee q \vee \neg r) \wedge (p \vee \neg q \vee r) \wedge (\neg p \wedge \neg q \wedge r)$

3.

$$\frac{\frac{\frac{p \vee q \supset r}{+1} \quad \frac{q}{+2}}{p \vee q} \vee \mathcal{I}_R}{r} \supset \mathcal{E}$$

$$\frac{\frac{r \vee s}{r \vee s} \vee \mathcal{I}_L}{q \supset r \vee s} \supset \mathcal{I}, -2$$

$$\frac{}{(p \vee q \supset r) \supset (q \supset r \vee s)} \supset \mathcal{I}, -1$$

$$\frac{\frac{\frac{q \rightarrow p, q, r, s}{q \rightarrow p, q, r, s} \text{ hyp.}}{q \rightarrow p \vee q, r, s} \vee \mathcal{R} \quad \frac{}{r, q \rightarrow r, s} \text{ hyp.}}{p \vee q \supset r, q \rightarrow r, s} \supset \mathcal{L}$$

$$\frac{\frac{p \vee q \supset r, q \rightarrow r, s}{p \vee q \supset r, q \rightarrow r \vee s} \vee \mathcal{R}}{p \vee q \supset r \rightarrow q \supset r \vee s} \supset \mathcal{R}$$

$$\frac{}{\rightarrow (p \vee q \supset r) \supset (q \supset r \vee s)} \supset \mathcal{R}$$

$$\frac{\frac{\frac{\frac{\neg p}{+3} \quad p}{+4} \neg \mathcal{E}}{\perp} \perp \mathcal{E}}{\neg(p \supset q) \quad p \supset q} \supset \mathcal{I}, -4$$

$$\frac{\frac{p}{+2} \quad \frac{\perp}{p} \perp \mathcal{E}}{p} \text{ dil., } -2, -3$$

$$\frac{}{\neg(p \supset q) \supset p} \supset \mathcal{I}, -1$$

$$\frac{\frac{\frac{\frac{p \rightarrow q, p}{\rightarrow p \supset q, p} \text{ hyp.}}{\rightarrow p \supset q, p} \supset \mathcal{R}}{\neg(p \supset q) \rightarrow p} \neg \mathcal{L}}{\rightarrow \neg(p \supset q) \supset p} \supset \mathcal{R}$$