Lista 7

1) Indique a regra de interferencia que justifica a validade de:

a) $\{ (p \to q) \} \models (p \to q) \lor \sim r$

$(p \to q)$ Adição

$(p \to q) \lor \sim r$

b) $\{ \sim p \land (q \to r) \} \models \sim p$

1. $\underline{\sim p \land (q \to r)} \models \sim p$ Simplificação

   $\sim p$

c) $\{ (p \to q), (q \to \sim r) \} \models (p \to \sim r)$

1. $p \to q$ Silogismo Hipotético

2. $\underline{q \to \sim r}$

   $p \to \sim r$

d) $\{ p \to (q \to r), p \models (q \to r)$

1. p Modus Ponens

2. $\underline{p \to (q \to r)}$

   $(q \to r)$

e) $\{ (q \lor r) \to \sim p, \sim \sim p \} \models \sim (q \lor r)$

1. $(q \lor r) \to \sim p$ Modus tollens

   $\underline{\sim p}$

   $\sim (q \lor r)$

f) $\{ p \to q), (r \to \sim z) \} \models (p \to q) \land (r \to \sim z)$

1. $(p \to q)$ Conjugação

2. $(r \to \sim z)$

   $(p \to q) \land (r \to \sim z)$

g) $\{(p \wedge q) \vee (\sim p \wedge r), \sim(\sim p \wedge r)\} \models p \wedge q$

1. $(p \wedge q) \vee (\sim p \wedge r)$ | Silogismo disjuntivo |

2. $\sim(\sim p \wedge r)$

$$\overline{\quad\quad p \wedge q \quad\quad}$$

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2) Indique uma possível conclusão para:

a) $\{(s \vee t) \to (r \wedge q), (r \wedge q) \to \sim p\}$

1. $(s \vee t) \to (r \wedge q)$

2. $(r \wedge q) \to \sim p$

$$\overline{(s \vee t) \to (\sim p)}$$

b) $\{(p \leftrightarrow q) \to \sim(r \wedge s), \sim\sim(r \wedge s)\}$

1. $(p \leftrightarrow q) \to \sim(r \wedge s)$

2. $\sim(r \wedge s)$

$$\overline{\quad \sim(p \leftrightarrow q) \quad}$$

c) $\{s \vee (r \wedge t), \sim s\}$

$$\sim s$$
$$\overline{\quad (r \wedge t) \quad}$$

d) $\{p \to (r \vee \sim s), (r \vee \sim s) \to t\}$

1. $p \to (r \vee \sim s)$

2. $(r \vee \sim s) \to t$

$$\overline{\quad p \to t \quad}$$

e) $\{p \to r, \sim q \to \sim s, p \vee \sim q\}$

1. $p \to r$

2. $\sim q \to \sim s$

3. $p \vee \sim q$

1) $\{\overset{A}{\sim p} \lor \overset{B}{\sim q}, \overset{\sim B}{\sim\sim q}\}$

$\sim p \lor q$ Silogismo Disjuntivo

$\sim q$

$\sim P$

2) $\{\overset{A}{P} \to (\overset{B}{\sim r \land q}), \overset{B}{\sim(\sim r \land q)} \lor \overset{D}{\sim r}, \overset{D}{\sim q} \to \overset{D}{r}$

$1. \ P \to (\sim r \land q)$ Dilema Destrutivo.

$\sim q \to r$

$\sim(\sim r \land q) \lor \sim r$

$\sim P \lor \sim\sim q$

3. Construa as deduções

a) $\{(\overset{A}{P \land q}) \to \overset{B}{r}, P, q\} \models r$

1. $(p \land q) \to r$

2. P | Conjugao

3. q |

4. $p \land q)$ Modus Ponens

5. $\land P \land q)$

6. $(p \land q) \to r$

b) $\{\overset{A}{P} \to q, \overset{B}{\sim p} \to \overset{B}{r}, \overset{C}{\sim q}\} \models r$

1. $P \to q$ (Modus tollens) 1,3

2. $\sim p \to r$ Modus Ponens 6,2

3. $\sim q$

4. $P \to q$

5. $\sim q$

6. P

7. $\sim p \to r$

r

c) { $p \to q$, $q \to \sim\sim r$, $\iota \to \sim r$, p

1. $p \to q$ Silogismo D. Hipotético (1,2)
2. $q \to \sim\sim r$
3. $S \to \sim R$ Modus Ponens (4,5)
4. P
5. $p \to \sim\sim r$ Modus tollens (3,6)
6. $\sim\sim r$
7. $\sim S$

d) { $p \wedge q$, $p \to r$, $q \to \iota$ } $\models R \wedge S$

1. $p \wedge q$ Simplificação (1)
2. $p \to r$ Modus Ponens (2,4)
3. $q \to \iota$ Simplificação (1)'
4. P Modus Ponens (2,4
5. q M.P (3,5)
6. R
7. ι
7. $R \wedge S$ (Conjunção (6,7))

c) $p \to (\sim q \wedge R)$, P, $S \to q$, $S \cup t$ $\models t$
1. $p \to (\sim q \wedge R)$
2. P
3. $S \to q$
4. $S \cup t$
5. $\sim q \wedge R$ (Ponnens 1,2)
6. $\sim q$ (Simplificação)
7. $\sim S$ tollens (3,6)
8. t Disjuntivo (4,7)

f) $(P \lor q) \to (P \to (r \land t))$, $P \land r \models t \lor v$

1. $(P \lor q) \to (P \to (s \land t))$
2. $P \land R$
3. P (Simp. 2)
4. $P \lor q$ (Adição 3)
5. $P \to (s \land t)$ (Ponnens 1,4)
6. $s \land t$ Ponnens (3,5)
7. t (Simplificação 6)
8. $t \lor v$ (Adição 7)

g) $P \to q$, $\sim q$, $(\sim P \lor \sim R) \to S \models S$

1. $P \to q$
2. $\sim q$
3. $(\sim P \lor \sim R) \to S$
4. $\sim P$ M.t (1,2)
5. $\sim P \lor \sim R$ (Ad. 4)
6. S (M.P 3,5)

h) $P \to \sim R$, P, $S \to R \models \sim S$

1. $P \to \sim R$
2. P
3. $S \to R$
4. $\sim R$ (MP (1,2)
5. $\sim S$ M.t (3,4)

i) $P \to q$, $P \to \sim R$, $P \models q \land \sim R$

1. $P \to q$
2. $P \to \sim R$
3. P
4. q MP (1,3)
5. $\sim R$ (MP 2,3)
6. $q \land \sim R$ (Conj. 5,6)

j) $\sim P \cup \sim \sim q$, $\sim \sim P$, $\sim R \rightarrow \sim q \models \sim \sim R$

1. $\sim P \cup \sim \sim q$
2. $\sim \sim P$
3. $\sim R \rightarrow \sim q$
4. $\sim \sim q$ S.D $(1,2)$
5. $\sim \sim R$ M.t $(3,4)$

k) $P \wedge \sim q$, $q \cup \sim R$, $S \rightarrow R \models P \wedge \sim S$

1. $P \wedge \sim q$
2. $q \cup \sim R$
3. $S \rightarrow R$
4. $\sim q$ Simp (1)
5. $\sim R$ S.D $(2,4)$
6. $\sim S$ M.t $(3,5)$
7. P Simp (1)
8. $P \wedge \sim S$ Conjunção $(6,7)$