# Rules of Inference

| Rules of Inference | Tautology | Name |
|---|---|---|
| $p \to q$<br>$p$<br>$\therefore q$ | $[p \wedge (p \to q)] \to q$ | Modus ponens |
| $\neg q$<br>$p \to q$<br>$\therefore \neg p$ | $[\neg q \wedge (p \to q)] \to \neg p$ | Modus tollen |
| $p \to q$<br>$q \to r$<br>$\therefore p \to r$ | $[(p \to q) \wedge (q \to r)] \to (p \to r)$ | Hypothetical syllogism |
| $(p \vee q)$<br>$\neg p$<br>$\therefore q$ | $[(p \vee q) \wedge \neg p] \to q$ | Disjunctive syllogism |
| $P$<br>$\therefore (p \vee q)$ | $p \to (p \vee q)$ | Addition |
| $(p \wedge q)$<br>$\therefore p$ | $(p \wedge q) \to p$ | Simplification |
| $p$<br>$q$<br>$\therefore (p \wedge q)$ | $[(p) \wedge (q)] \to (p \wedge q)$ | Conjunction |
| $(p \vee q)$<br>$(\neg p \vee r)$<br>$\therefore (p \vee r)$ | $[(p \vee q) \wedge (\neg p \vee r)] \to (p \vee r)$ | Resolution |