## Superposition Reduction Rules

**Subsumption** $(N \uplus \{C_1, C_2\}) \Rightarrow_{\text{SUP}} (N \cup \{C_1\})$
provided $C_1 \subset C_2$

**Tautology Deletion** $(N \uplus \{C \lor P \lor \neg P\}) \Rightarrow_{\text{SUP}} (N)$

**Condensation** $(N \uplus \{C_1 \lor L \lor L\}) \Rightarrow_{\text{SUP}} (N \cup \{C_1 \lor L\})$

**Subsumption Resolution** $(N \uplus \{C_1 \lor L, C_2 \lor \text{comp}(L)\})$
$\Rightarrow_{\text{SUP}} (N \cup \{C_1 \lor L, C_2\})$
where $C_1 \subseteq C_2$

### 2.7.8 Proposition (Reduction Rules)

All clauses removed by Subsumption, Tautology Deletion, Condensation and Subsumption Resolution are redundant with respect to the kept or added clauses.

### 2.7.9 Corollary (Soundness)

Superposition is sound.

### 2.7.10 Theorem (Completeness)

If $N$ is saturated up to redundancy and $\perp \notin N$ then $N$ is satisfiable and $N_\mathcal{I} \models N$.