Superposition Reduction Rules

**Subsumption**

\[
(N \uplus \{C_1, C_2\}) \Rightarrow_{SUP} (N \uplus \{C_1\})
\]

provided \(C_1 \subseteq C_2\)

**Tautology Deletion**

\[
(N \uplus \{C \lor P \lor \neg P\}) \Rightarrow_{SUP} (N)
\]

**Condensation**

\[
(N \uplus \{C_1 \lor L \lor L\}) \Rightarrow_{SUP} (N \uplus \{C_1 \lor L\})
\]

**Subsumption Resolution**

\[
(N \uplus \{C_1 \lor L, C_2 \lor \text{comp}(L)\}) \Rightarrow_{SUP} (N \uplus \{C_1 \lor L, C_2\})
\]

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 $\bot \notin N$ then $N$ is satisfiable and $N_\mathcal{I} \models N$. 