$\{L_1, \ldots, L_n\}$ is *unifiable* iff there is a σ with $\sigma(L_1) = \ldots = \sigma(L_n)$.
σ is *mgu* iff for every unifier σ' there is a substitution δ with $\sigma' = \delta \circ \sigma$.

Unification Algorithm

1. Let $\sigma = \varnothing$ be the "identical" substitution.

2. If $|\sigma(K)| = 1$, then stop and return σ.

3. Otherwise, check all $\sigma(L_i)$ in parallel from left to right, until there are different symbols in two literals.

4. If none of these symbols is a variable, then stop with *clash failure*.

5. Otherwise, let X be the variable and t be the subterm in the other literal. If X occurs in t, then stop with *occur failure*.

6. Otherwise, let $\sigma = \{X/t\} \circ \sigma$ und go back to step 2.

Resolution for Predicate Logic

R is a *resolvent* of K_1 and K_2 iff

- $\nu_1(K_1)$ and $\nu_2(K_2)$ are variable-disjoint

- $L_1, \ldots, L_m \in \nu_1(K_1)$, $L'_1, \ldots, L'_n \in \nu_2(K_2)$ with $n, m \geq 1$ and $\{\overline{L_1}, \ldots, \overline{L_m}, L'_1, \ldots, L'_n\}$ has mgu σ

- $R = \sigma((\nu_1(K_1) \setminus \{L_1, \ldots, L_m\}) \cup (\nu_2(K_2) \setminus \{L'_1, \ldots, L'_n\}))$

Example

$\{\underline{\mathsf{p}(\mathsf{f}(X))}, \neg\mathsf{q}(Z), \underline{\mathsf{p}(Z)}\}$ $\qquad$ $\{\underline{\neg\mathsf{p}(X)}, \mathsf{r}(\mathsf{g}(X))\}$

$\{\neg\mathsf{q}(\mathsf{f}(X)), \mathsf{r}(\mathsf{g}(\mathsf{f}(X)))\}$

$$\begin{aligned} \nu_1 &= \varnothing \\ \nu_2 &= \{X/U, U/X\} \\ \sigma &= \{Z/\mathsf{f}(X), U/\mathsf{f}(X)\} \end{aligned}$$