

Unification

An equation: $u \approx v$.

A unification problem

Input: A set of equation $\{u_1 \approx v_1, u_2 \approx v_2, \dots, u_n \approx v_n\}$.

Output: A substitution θ such that

$u_1\theta \approx v_1\theta, u_2\theta \approx v_2\theta, \dots, u_n\theta \approx v_n\theta$ or not unifiable.

Unification algorithm

Input: $S = \{u_1 \approx v_1, u_2 \approx v_2, \dots, u_n \approx v_n\}$.

Output: mgu θ or not unifiable.

- ▶ $\theta = \{\}$.
- ▶ While $S \neq \{\}$:
 - ▶ Select $u \approx v \in S$.
 - ▶ $S = S \setminus \{u \approx v\}$.
 - ▶ Apply one of the following rules:
 1. If $u \approx v$ is of the form $X \approx t$ or $t \approx X$ and X does not occur in t then $\theta = \theta\{X/t\}$ and $S = S\theta$.
 2. If $u \approx v$ is of the form $X \approx X$ then do nothing.
 3. If $u \approx v$ is of the form $f(s_1, \dots, s_m) \approx f(t_1, \dots, t_m)$ then $S = S \cup \{s_1 \approx t_1, \dots, s_m \approx t_m\}$.
 4. Otherwise return not unifiable.