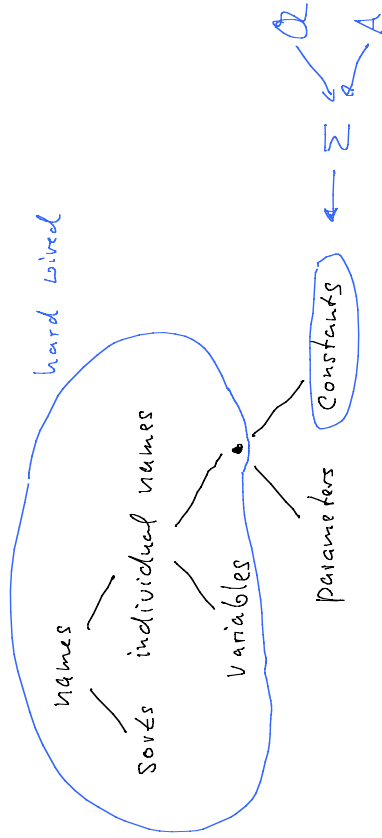


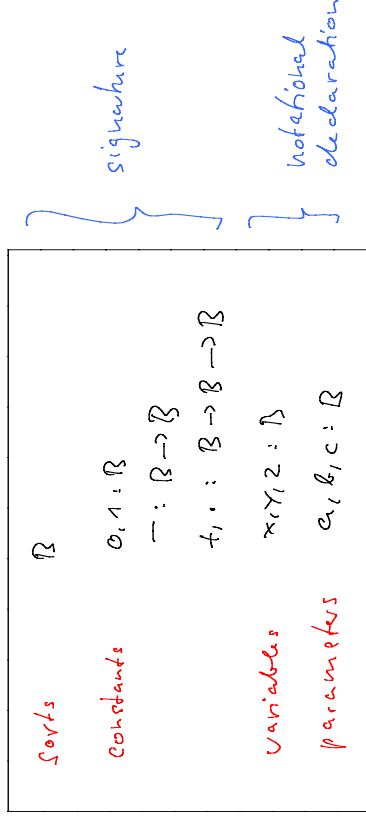
Parameters

2006/6/12



- parameters = individual names
minus Variables
minus Constants
 - Variables and parameters act both as "unknowns"
 - Variables are generative, parameters are not
- $$x.1 = x \vdash a.1 = a$$
- $$\vdash (x+a).1 = x+a$$

Example



Generativity

$$\text{Ker } \theta \leq \text{Var} \Rightarrow \{ \ell \} \vdash y \theta \neq \emptyset$$

The deduction rule behind generativity is Σ
Semantically generativity amounts to universal quantification

$$\Omega \neq \emptyset \Leftrightarrow \forall y: \Omega \leq y \Rightarrow y \neq \emptyset$$

Structures must not interpret variables

Do we need variables??

Do specifications need variables?

$\forall A \exists A': A' \text{ closed} \wedge A \vdash A'$?

$\{x.\top = x\} \vdash$

Deduction Rule \exists

$$\frac{\top = t}{\lambda x. \top = \lambda x. t}$$

• Sound if x var: $\forall Q: Q \vdash \top = t \Rightarrow Q \vdash \lambda x. \top = \lambda x. t$

• unsound otherwise:

$$a \cdot u = a \quad \rightsquigarrow \quad \lambda u. a \cdot u = \lambda u. a$$

$$\rightsquigarrow \quad \lambda x. a \cdot x = \lambda x. a$$

$$\int, u = \top$$

$$) a = \top$$

The unknowns of equation systems should be parameters

$$\{a \cdot b = 0, a + b = \top\} \stackrel{BA}{\vdash} \{a = \overline{0}\}$$

$$\{x \cdot y = 0, x + y = \top\} \stackrel{BA}{\vdash} \{x = \top\}$$

Deduction without \exists seems incomplete

$$\vdash \lambda x. (\lambda x. x) x = \lambda x. x \quad ?$$

Stability

③ stable for $A \Rightarrow$

1) $A \vdash \epsilon \Rightarrow y_{0A} \vdash y_{0\epsilon}$

2) $A \vDash \epsilon \Rightarrow y_{0A} \vDash y_{0\epsilon}$

③ stable for $A : \Leftrightarrow$

1) $\text{Ker } \Theta \cap \text{Var} = \emptyset$

2) $\forall \epsilon \in A \quad \forall c \in U_{\epsilon} \quad \exists x \in U(\Theta c) : x \neq U_{\epsilon} c$
↑
constant or parameter

(a) satisfied if A closed or Θc closed for $c \in \text{Ker } \Theta$

Counter examples

$x \cdot 1 = x$

$\Theta = \{1 := x\}$

$x \cdot x = x$

Condition (2)
not needed if
there are no
variables