

## axd.1 Axioms and Rules for Quantifiers

fol:axd:qua:  
sec

**Definition axd.1 (Axioms for quantifiers).** The *axioms* governing quantifiers are all instances of the following:

fol:axd:qua:  
ax:q1  
fol:axd:qua:  
ax:q2

$$\forall x \psi \rightarrow \psi(t), \quad (1)$$

$$\psi(t) \rightarrow \exists x \psi. \quad (2)$$

for any ground term  $t$ .

**Definition axd.2 (Rules for quantifiers).**

If  $\psi \rightarrow \varphi(a)$  already occurs in the **derivation** and  $a$  does not occur in  $\Gamma$  or  $\psi$ , then  $\psi \rightarrow \forall x \varphi(x)$  is a correct inference step.

If  $\varphi(a) \rightarrow \psi$  already occurs in the **derivation** and  $a$  does not occur in  $\Gamma$  or  $\psi$ , then  $\exists x \varphi(x) \rightarrow \psi$  is a correct inference step.

We'll abbreviate either of these by "QR."

## Photo Credits

## Bibliography