

# Logiweb sequent calculus, Chores

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## 1 Test cases

$[[\bar{x}] \#^0 [\bar{y} = \bar{z} \Rightarrow \forall_{\text{obj}} \bar{x}: \bar{x} = \bar{y}]]$ , check]

$[[\bar{x}] \#^0 [\bar{x} = \bar{z} \Rightarrow \forall_{\text{obj}} \bar{x}: \bar{x} = \bar{y}]]^-$

$[[\bar{x}] \#^0 [\bar{y} = \bar{x} \Rightarrow \forall_{\text{obj}} \bar{x}: \bar{x} = \bar{y}]]^-$

$[[\bar{x}] \#^0 [\bar{y} = \bar{z} \Rightarrow \forall_{\text{obj}} \bar{y}: \bar{x} = \bar{y}]]^-$

$[[\langle [\bar{a}] \equiv^0 [\bar{a}] \mid [\bar{b}] := [\bar{c}] \rangle]]$ , check]

$[[\langle [\bar{b}] \equiv^0 [\bar{a}] \mid [\bar{b}] := [\bar{c}] \rangle]]^-$

$[[\langle [\bar{c}] \equiv^0 [\bar{a}] \mid [\bar{b}] := [\bar{c}] \rangle]]^-$

$[[\langle [\bar{a}] \equiv^0 [\bar{b}] \mid [\bar{b}] := [\bar{c}] \rangle]]^-$

$[[\langle [\bar{b}] \equiv^0 [\bar{b}] \mid [\bar{b}] := [\bar{c}] \rangle]]^-$

$[[\langle [\bar{c}] \equiv^0 [\bar{b}] \mid [\bar{b}] := [\bar{c}] \rangle]]$ , check]

$[[\langle [\forall_{\text{obj}} \bar{a}: \bar{a} = \bar{b}] \equiv^0 [\forall_{\text{obj}} \bar{a}: \bar{a} = \bar{b}] \mid [\bar{a}] := [\bar{c}]] \rangle]]$ , check]

$[[\langle [\forall_{\text{obj}} \bar{a}: \bar{a} = \bar{c}] \equiv^0 [\forall_{\text{obj}} \bar{a}: \bar{a} = \bar{b}] \mid [\bar{b}] := [\bar{c}]] \rangle]]$ , check]

$[[\langle [\forall_{\text{obj}} \bar{a}: \bar{a} = 0 + \bar{a} \Rightarrow \bar{c} \cdot \bar{d} = 0 + \bar{c} \cdot \bar{d}] \equiv^0 [\forall_{\text{obj}} \bar{a}: \bar{a} = 0 + \bar{a} \Rightarrow \bar{b} = 0 + \bar{b}] \mid [\bar{b}] := [\bar{c} \cdot \bar{d}]] \rangle]]$ , check]

$[(\forall_{\text{obj}} \bar{a}: \bar{a} = 0 + \bar{a} \Rightarrow \bar{b} = 0 + \bar{b}) \equiv^0 (\forall_{\text{obj}} \bar{a}: \bar{a} = 0 + \bar{a} \Rightarrow \bar{b} = 0 + \bar{b}) \mid (\bar{a} := \bar{c})] \text{ 'check}'$

$[\lambda x. \text{Ded}_0([\bar{0}], [\bar{0}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\bar{0}], [\bar{1}]) \text{ 'check}]^-$

$[\text{Ded}_8([\forall \underline{a}: \underline{a}], \top)]$

$[\text{Ded}_7([\forall \underline{a}: \underline{a}] \stackrel{t}{=} [\underline{a}])]$

$[\lambda x. \text{Ded}_0([\forall \underline{a}: \underline{a}], [\underline{a}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\underline{a}], [\underline{b}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\forall \underline{a}: \underline{a}], [\underline{b}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\forall \underline{a}: \forall \underline{b}: \underline{a} \vdash \underline{b}], [\underline{a} \Rightarrow \underline{b}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\forall \underline{a}: \forall \underline{b}: \underline{a} \vdash \underline{b}], [\underline{a} \Rightarrow \underline{a}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\forall \underline{a}: \forall \underline{b}: \underline{a} \vdash \underline{b}], [\underline{b} \Rightarrow \underline{b}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\forall \underline{a}: \forall \underline{b}: \underline{a} \vdash \underline{b}], [\bar{0}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\bar{0}], [\underline{a} \Rightarrow \underline{a}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\forall \underline{a}: \forall \underline{b}: \forall \underline{c}: \underline{a} \vdash \underline{b} \vdash \underline{c}], [\underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\forall \underline{a}: \forall \underline{b}: \underline{a} \vdash \underline{b} \vdash \underline{a}], [\underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\forall \underline{a}: \forall \underline{b}: \forall \underline{c}: \underline{a} \vdash \underline{b} \vdash \underline{c}], [\underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\bar{0}], [\bar{x}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\bar{x}], [\bar{0}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\bar{x}], [\bar{x}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\forall_{\text{obj}} \bar{x}: \bar{x}], [\bar{x}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\bar{x}], [\forall_{\text{obj}} \bar{y}: \bar{z}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\forall_{\text{obj}} \bar{x}: \bar{x}], [\forall_{\text{obj}} \bar{x}: \bar{x}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\bar{0} \vdash \bar{0}], [\bar{0} \Rightarrow \bar{0}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\bar{x} \vdash \bar{0}], [\bar{0} \Rightarrow \bar{0}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\bar{0} \vdash \bar{x}], [\bar{0} \Rightarrow \bar{0}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\bar{x} \vdash \bar{x}], [\bar{0} \Rightarrow \bar{0}]) \text{ 'check}]^-$

$[\lambda x. \text{Ded}_0([\bar{0} \vdash \bar{0}], [\forall_{\text{obj}} \bar{x}: \bar{0} \Rightarrow \bar{0}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([\bar{x} \vdash \bar{0}], [\forall_{\text{obj}} \bar{x}: \bar{x} \Rightarrow \bar{0}]) \text{ 'check}']$

$[\lambda x. \text{Ded}_0([0 \vdash \bar{x}], [\forall_{\text{obj}} \bar{x}: 0 \Rightarrow \bar{x}])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([\bar{x} \vdash \bar{x}], [\forall_{\text{obj}} \bar{x}: \bar{x} \Rightarrow \bar{x}])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([0 \vdash 0], [0 \Rightarrow \forall_{\text{obj}} \bar{x}: 0])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([\bar{x} \vdash 0], [0 \Rightarrow \forall_{\text{obj}} \bar{x}: 0])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([0 \vdash \bar{x}], [0 \Rightarrow \forall_{\text{obj}} \bar{y}: \bar{z}])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([\bar{x} \vdash \bar{x}], [0 \Rightarrow \forall_{\text{obj}} \bar{x}: \bar{x}])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([0 \vdash 0], [\forall_{\text{obj}} \bar{x}: 0 \Rightarrow \forall_{\text{obj}} \bar{x}: 0])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([\bar{x} \vdash 0], [\forall_{\text{obj}} \bar{x}: \bar{x} \Rightarrow \forall_{\text{obj}} \bar{x}: 0])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([0 \vdash \bar{x}], [\forall_{\text{obj}} \bar{x}: 0 \Rightarrow 2])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([\bar{x} \vdash \bar{x}], [\forall_{\text{obj}} \bar{x}: \bar{x} \Rightarrow 3])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([\bar{x} + \bar{y} = \bar{y} + \bar{x}], [2 + 3 = 3 + 2])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([\bar{x} + \bar{y} = \bar{y} + \bar{x}], [2 + 3 = 2 + 3])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([\bar{x} + \bar{y} = \bar{y} + \bar{x}], [2 + 3 = 2 + 2])] \text{ 'check}' \cdot$   
 $[\lambda x. \text{Ded}_0([\bar{x} + \bar{y} = \bar{y} + \bar{x}], [2 + 3 = 3 + 3])] \text{ 'check}' \cdot$

## 2 Pyk definitions

$[[* \stackrel{\text{pyk}}{=} *] \text{ "general macro define " as " end define"}]$   
 $[\text{RootVisible}(*) \stackrel{\text{pyk}}{\text{pyk}} \text{ "make root visible " end visible"}]$   
 $[A \stackrel{\text{pyk}}{\text{pyk}} \text{ "sequent example axiom"}]$   
 $[R \stackrel{\text{pyk}}{\text{pyk}} \text{ "sequent example rule"}]$   
 $[C \stackrel{\text{pyk}}{\text{pyk}} \text{ "sequent example contradiction"}]$   
 $[T \stackrel{\text{pyk}}{\text{pyk}} \text{ "sequent example theory"}]$   
 $[L \stackrel{\text{pyk}}{\text{pyk}} \text{ "sequent example lemma"}]$   
 $[\{*\} \stackrel{\text{pyk}}{\text{pyk}} \text{ "set " end set"}]$   
 $[\bar{*} \stackrel{\text{pyk}}{\text{pyk}} \text{ "object var " end var"}]$   
 $[a \stackrel{\text{pyk}}{\text{pyk}} \text{ "object a"}]$   
 $[b \stackrel{\text{pyk}}{\text{pyk}} \text{ "object b"}]$   
 $[c \stackrel{\text{pyk}}{\text{pyk}} \text{ "object c"}]$   
 $[d \stackrel{\text{pyk}}{\text{pyk}} \text{ "object d"}]$   
 $[e \stackrel{\text{pyk}}{\text{pyk}} \text{ "object e"}]$   
 $[f \stackrel{\text{pyk}}{\text{pyk}} \text{ "object f"}]$

$[g \xrightarrow{\text{pyk}} \text{"object g"}]$

$[h \xrightarrow{\text{pyk}} \text{"object h"}]$

$[i \xrightarrow{\text{pyk}} \text{"object i"}]$

$[j \xrightarrow{\text{pyk}} \text{"object j"}]$

$[k \xrightarrow{\text{pyk}} \text{"object k"}]$

$[l \xrightarrow{\text{pyk}} \text{"object l"}]$

$[m \xrightarrow{\text{pyk}} \text{"object m"}]$

$[n \xrightarrow{\text{pyk}} \text{"object n"}]$

$[o \xrightarrow{\text{pyk}} \text{"object o"}]$

$[p \xrightarrow{\text{pyk}} \text{"object p"}]$

$[q \xrightarrow{\text{pyk}} \text{"object q"}]$

$[r \xrightarrow{\text{pyk}} \text{"object r"}]$

$[s \xrightarrow{\text{pyk}} \text{"object s"}]$

$[t \xrightarrow{\text{pyk}} \text{"object t"}]$

$[u \xrightarrow{\text{pyk}} \text{"object u"}]$

$[v \xrightarrow{\text{pyk}} \text{"object v"}]$

$[w \xrightarrow{\text{pyk}} \text{"object w"}]$

$[x \xrightarrow{\text{pyk}} \text{"object x"}]$

$[y \xrightarrow{\text{pyk}} \text{"object y"}]$

$[z \xrightarrow{\text{pyk}} \text{"object z"}]$

$[\langle * \equiv * \mid * := * \rangle \xrightarrow{\text{pyk}} \text{"sub " is " where " is " end sub"}]$

$[\langle * \equiv^0 * \mid * := * \rangle \xrightarrow{\text{pyk}} \text{"sub zero " is " where " is " end sub"}]$

$[\langle * \equiv^1 * \mid * := * \rangle \xrightarrow{\text{pyk}} \text{"sub one " is " where " is " end sub"}]$

$[\langle * \equiv^* * \mid * := * \rangle \xrightarrow{\text{pyk}} \text{"sub star " is " where " is " end sub"}]$

$[\text{Ded}(*, *) \xrightarrow{\text{pyk}} \text{"deduction " conclude " end deduction"}]$

$[\text{Ded}_0(*, *) \xrightarrow{\text{pyk}} \text{"deduction zero " conclude " end deduction"}]$

$[\text{Ded}_1(*, *, *) \xrightarrow{\text{pyk}} \text{"deduction one " conclude " condition " end deduction"}]$

$[\text{Ded}_2(*, *, *) \xrightarrow{\text{pyk}} \text{"deduction two " conclude " condition " end deduction"}]$

$[\text{Ded}_3(*, *, *, *) \xrightarrow{\text{pyk}} \text{"deduction three " conclude " condition " bound " end deduction"}]$

$[\text{Ded}_4(*, *, *, *) \xrightarrow{\text{pyk}} \text{"deduction four " conclude " condition " bound " end deduction"}]$

$[\text{Ded}_4^*(*, *, *, *) \xrightarrow{\text{pyk}} \text{"deduction four star " conclude " condition " bound " end deduction"}]$

$[\text{Ded}_5(*, *, *, *) \xrightarrow{\text{pyk}} \text{"deduction five " condition " bound " end deduction"}]$

$[\text{Ded}_6(*, *, *, *) \xrightarrow{\text{pyk}} \text{"deduction six " conclude " exception " bound " end"}]$

deduction”]

[Ded<sub>6</sub><sup>\*</sup>(\*, \*, \*, \*)  $\xrightarrow{\text{pyk}}$  “deduction six star " conclude " exception " bound " end deduction”]

[Ded<sub>7</sub>(\*)  $\xrightarrow{\text{pyk}}$  “deduction seven " end deduction”]

[Ded<sub>8</sub>(\*, \*)  $\xrightarrow{\text{pyk}}$  “deduction eight " bound " end deduction”]

[Ded<sub>8</sub><sup>\*</sup>(\*, \*)  $\xrightarrow{\text{pyk}}$  “deduction eight star " bound " end deduction”]

[S  $\xrightarrow{\text{pyk}}$  “system s”]

[Neg  $\xrightarrow{\text{pyk}}$  “double negation”]

[MP  $\xrightarrow{\text{pyk}}$  “rule mp”]

[Gen  $\xrightarrow{\text{pyk}}$  “rule gen”]

[Ded  $\xrightarrow{\text{pyk}}$  “deduction”]

[S1  $\xrightarrow{\text{pyk}}$  “axiom s one”]

[S2  $\xrightarrow{\text{pyk}}$  “axiom s two”]

[S3  $\xrightarrow{\text{pyk}}$  “axiom s three”]

[S4  $\xrightarrow{\text{pyk}}$  “axiom s four”]

[S5  $\xrightarrow{\text{pyk}}$  “axiom s five”]

[S6  $\xrightarrow{\text{pyk}}$  “axiom s six”]

[S7  $\xrightarrow{\text{pyk}}$  “axiom s seven”]

[S8  $\xrightarrow{\text{pyk}}$  “axiom s eight”]

[S9  $\xrightarrow{\text{pyk}}$  “axiom s nine”]

[Repetition  $\xrightarrow{\text{pyk}}$  “repetition”]

[A1'  $\xrightarrow{\text{pyk}}$  “lemma a one”]

[A2'  $\xrightarrow{\text{pyk}}$  “lemma a two”]

[A4'  $\xrightarrow{\text{pyk}}$  “lemma a four”]

[A5'  $\xrightarrow{\text{pyk}}$  “lemma a five”]

[Prop 3.2a  $\xrightarrow{\text{pyk}}$  “prop three two a”]

[Prop 3.2b  $\xrightarrow{\text{pyk}}$  “prop three two b”]

[Prop 3.2c  $\xrightarrow{\text{pyk}}$  “prop three two c”]

[Prop 3.2d  $\xrightarrow{\text{pyk}}$  “prop three two d”]

[Prop 3.2e<sub>1</sub>  $\xrightarrow{\text{pyk}}$  “prop three two e one”]

[Prop 3.2e<sub>2</sub>  $\xrightarrow{\text{pyk}}$  “prop three two e two”]

[Prop 3.2e  $\xrightarrow{\text{pyk}}$  “prop three two e”]

[Prop 3.2f<sub>1</sub>  $\xrightarrow{\text{pyk}}$  “prop three two f one”]

[Prop 3.2f<sub>2</sub>  $\xrightarrow{\text{pyk}}$  “prop three two f two”]

[Prop 3.2f  $\xrightarrow{\text{pyk}}$  “prop three two f”]

[Prop 3.2g<sub>1</sub>  $\xrightarrow{\text{pyk}}$  “prop three two g one”]

[Prop 3.2g<sub>2</sub>  $\xrightarrow{\text{pyk}}$  “prop three two g two”]  
 [Prop 3.2g  $\xrightarrow{\text{pyk}}$  “prop three two g”]  
 [Prop 3.2h<sub>1</sub>  $\xrightarrow{\text{pyk}}$  “prop three two h one”]  
 [Prop 3.2h<sub>2</sub>  $\xrightarrow{\text{pyk}}$  “prop three two h two”]  
 [Prop 3.2h  $\xrightarrow{\text{pyk}}$  “prop three two h”]  
 [Block<sub>1</sub>(\*, \*, \*)  $\xrightarrow{\text{pyk}}$  “block one " state " cache " end block”]  
 [Block<sub>2</sub>(\*)  $\xrightarrow{\text{pyk}}$  “block two " end block”]  
 [\*hide  $\xrightarrow{\text{pyk}}$  “" hide”]  
 [MacroIndent(\*)  $\xrightarrow{\text{pyk}}$  “macro indent ”]  
 [\*'  $\xrightarrow{\text{pyk}}$  “" suc”]  
 [\* = \*  $\xrightarrow{\text{pyk}}$  “" equal ”]  
 [\* ≠ \*  $\xrightarrow{\text{pyk}}$  “" unequal ”]  
 [\*var  $\xrightarrow{\text{pyk}}$  “" is object var”]  
 [\*#<sup>0</sup>\*  $\xrightarrow{\text{pyk}}$  “" avoid zero ”]  
 [\*#<sup>1</sup>\*  $\xrightarrow{\text{pyk}}$  “" avoid one ”]  
 [\*#\*  $\xrightarrow{\text{pyk}}$  “" avoid star ”]  
 [∃\*: \*  $\xrightarrow{\text{pyk}}$  “exist " indeed ”]  
 [∀\*: \*  $\xrightarrow{\text{pyk}}$  “for all " indeed ”]  
 [∀obj\*: \*  $\xrightarrow{\text{pyk}}$  “for all objects " indeed ”]  
 [\* ⇒ \*  $\xrightarrow{\text{pyk}}$  “" imply ”]  
 [\* ⇔ \*  $\xrightarrow{\text{pyk}}$  “" if and only if ”]  
 [\*##  $\xrightarrow{\text{pyk}}$  “" avoid ”]  
 [\* ⊇ \*  $\xrightarrow{\text{pyk}}$  “" object modus ponens ”]  
 [Π\*: \*  $\xrightarrow{\text{pyk}}$  “for all terms " indeed ”]  
 [Begin\*; \* : End\*; \*  $\xrightarrow{\text{pyk}}$  “block " line " end block ”]  
 [Last block line \* ≫ \*; \*  $\xrightarrow{\text{pyk}}$  “because " indeed " end line”]  
 [Arbitrary ≫ \*; \*  $\xrightarrow{\text{pyk}}$  “any term " end line ”]  
 [\* | \*  $\xrightarrow{\text{pyk}}$  “" alternative ”]  
 [→  $\xrightarrow{\text{pyk}}$  “evaluates to”]  
 [\* \\ \*  $\xrightarrow{\text{pyk}}$  “" safe row ”]  
 [check  $\xrightarrow{\text{pyk}}$  “check”]

### 3 T<sub>E</sub>X definitions

$[ [x \stackrel{\text{tex}}{=} y] \rightarrow "$   
     $\{ \#1 / \text{tex name} / \text{tex} .$   
     $\backslash \text{stackrel} \{ \backslash \text{circ} \} \{ = \} \#2 .$   
     $\} ] "$

$[ \text{RootVisible}(x) \stackrel{\text{tex}}{\rightarrow} "\#1 / \text{tex name} / \text{tex} ."]$

$[ \text{RootVisible}(x) \stackrel{\text{name}}{\rightarrow} "$   
     $\text{RootVisible}(\#1 .$   
     $\) ] "$

$[ x^{\text{hide}} \stackrel{\text{tex}}{\rightarrow} "\#1 .$   
     $\{ \} ^ \{ \text{hide} \} ] "$

$[ x' \stackrel{\text{tex}}{\rightarrow} "\#1 .$   
     $\{ \} ] "$

$[ x = y \stackrel{\text{tex}}{\rightarrow} "\#1 .$   
     $= \#2 ."]$

$[ x \neq y \stackrel{\text{tex}}{\rightarrow} "\#1 .$   
     $\backslash \text{neq} \#2 ."]$

$[ x \Rightarrow y \stackrel{\text{tex}}{\rightarrow} "\#1 .$   
     $\backslash \text{Rightarrow} \#2 ."]$

$[ x \Leftrightarrow y \stackrel{\text{tex}}{\rightarrow} "\#1 .$   
     $\backslash \text{Leftrightarrow} \#2 ."]$

$[ x | y \stackrel{\text{tex}}{\rightarrow} "\#1 .$   
     $\backslash \text{mathrel} \{ | \} \#2 ."]$

$[ \exists x : y \stackrel{\text{tex}}{\rightarrow} "$   
     $\backslash \text{exists} \#1 .$   
     $\backslash \text{colon} \#2 ."]$

$[ \forall x : y \stackrel{\text{tex}}{\rightarrow} "$   
     $\backslash \text{forall} \#1 .$   
     $\backslash \text{colon} \#2 ."]$

$[ \forall_{\text{obj}} x : y \stackrel{\text{tex}}{\rightarrow} "$   
     $\backslash \text{forall}_{\text{obj}} \#1 .$   
     $\backslash \text{colon} \#2 ."]$

$[ \prod x : y \stackrel{\text{tex}}{\rightarrow} "$   
     $\backslash \text{Pi} \#1 .$   
     $\backslash \text{colon} \#2 ."]$

```
[Arbitrary >> i; p  $\xrightarrow{\text{tex}}$  “
  \newline \makebox [0.1\textwidth ][l]{\$
  \if \relax \csname lgwproofline\endcsname L-? \else
  \global \advance \lgwproofline by 1
  L\ifnum \lgwproofline <10 0\fi \number \lgwproofline
  \fi
  \$:}\makebox [0.4\textwidth ][l]{\$Arbitrary{\}\gg{\}\$}\quad
  \parbox [t]{0.4\textwidth }{\$#1.
  \$\hfill \makebox [0mm][l]{\quad ;}}#2.”]
```

```
[Arbitrary >> i; p  $\xrightarrow{\text{name}}$  “
  Arbitrary \gg #1.
  ; #2.”]
```

```
[x\y  $\xrightarrow{\text{tex}}$  “#1.
  \{\}\#2.”]
```

```
[x\y  $\xrightarrow{\text{name}}$  “#1.
  \backslash \backslash #2.”]
```

```
[A  $\xrightarrow{\text{tex}}$  “
  A”]
```

```
[R  $\xrightarrow{\text{tex}}$  “
  R”]
```

```
[C  $\xrightarrow{\text{tex}}$  “
  C”]
```

```
[T  $\xrightarrow{\text{tex}}$  “
  T”]
```

```
[L  $\xrightarrow{\text{tex}}$  “
  L”]
```

```
[{x}  $\xrightarrow{\text{tex}}$  “
  \{#1.
  \}”]
```

```
[S  $\xrightarrow{\text{tex}}$  “
  S”]
```

```
[Neg  $\xrightarrow{\text{tex}}$  “
  Neg”]
```

```
[S1  $\xrightarrow{\text{tex}}$  “
  S1”]
```



[S2  $\xrightarrow{\text{tex}}$  “  
S2”]

[S3  $\xrightarrow{\text{tex}}$  “  
S3”]

[S4  $\xrightarrow{\text{tex}}$  “  
S4”]

[S5  $\xrightarrow{\text{tex}}$  “  
S5”]

[S6  $\xrightarrow{\text{tex}}$  “  
S6”]

[S7  $\xrightarrow{\text{tex}}$  “  
S7”]

[S8  $\xrightarrow{\text{tex}}$  “  
S8”]

[S9  $\xrightarrow{\text{tex}}$  “  
S9”]

[MP  $\xrightarrow{\text{tex}}$  “  
MP”]

[Gen  $\xrightarrow{\text{tex}}$  “  
Gen”]

[Ded  $\xrightarrow{\text{tex}}$  “  
Ded”]

[Repetition  $\xrightarrow{\text{tex}}$  “  
Repetition”]

[A1'  $\xrightarrow{\text{tex}}$  “  
A1”’]

[A2'  $\xrightarrow{\text{tex}}$  “  
A2”’]

[A4'  $\xrightarrow{\text{tex}}$  “  
A4”’]

[A5'  $\xrightarrow{\text{tex}}$  “  
A5”’]

[ $x^{\text{var}}$   $\xrightarrow{\text{tex}}$  “#1.  
     $\{\}^{\{\text{var}\}}$ ”]

[ $x\#y$   $\xrightarrow{\text{tex}}$  “#1.  
     $\#\.#2.$ ”]

[ $x\#^0y$   $\xrightarrow{\text{tex}}$  “#1.  
     $\#\.^0\#2.$ ”]

[ $x\#^1y$   $\xrightarrow{\text{tex}}$  “#1.  
     $\#\.^1\#2.$ ”]

[ $x\#*y$   $\xrightarrow{\text{tex}}$  “#1.  
     $\#\.^*\#2.$ ”]

[ $\langle x\equiv y|z:=u \rangle$   $\xrightarrow{\text{tex}}$  “  
     $\langle \rangle$  #1.  
     $\{\equiv\}$  #2.  
     $|$  #3.  
     $\{:=\}$  #4.  
     $\langle \rangle$ ”]

[ $\langle x\equiv^0y|z:=u \rangle$   $\xrightarrow{\text{tex}}$  “  
     $\langle \rangle$  #1.  
     $\{\equiv\}^0$  #2.  
     $|$  #3.  
     $\{:=\}$  #4.  
     $\langle \rangle$ ”]

[ $\langle x\equiv^1y|z:=u \rangle$   $\xrightarrow{\text{tex}}$  “  
     $\langle \rangle$  #1.  
     $\{\equiv\}^1$  #2.  
     $|$  #3.  
     $\{:=\}$  #4.  
     $\langle \rangle$ ”]

[ $\langle x\equiv*y|z:=u \rangle$   $\xrightarrow{\text{tex}}$  “  
     $\langle \rangle$  #1.  
     $\{\equiv\}^*$  #2.  
     $|$  #3.  
     $\{:=\}$  #4.  
     $\langle \rangle$ ”]

[ $\text{Ded}(x, y)$   $\xrightarrow{\text{tex}}$  “  
     $\text{Ded}(\#1.$   
     $, \#2.$   
     $)$ ”]

[Ded<sub>0</sub>(x, y)  $\xrightarrow{\text{tex}}$  “  
Ded\_0(#1.  
, #2.  
)”]

[Ded<sub>1</sub>(x, y, z)  $\xrightarrow{\text{tex}}$  “  
Ded\_1(#1.  
, #2.  
, #3.  
)”]

[Ded<sub>2</sub>(x, y, z)  $\xrightarrow{\text{tex}}$  “  
Ded\_2(#1.  
, #2.  
, #3.  
)”]

[Ded<sub>3</sub>(x, y, z, u)  $\xrightarrow{\text{tex}}$  “  
Ded\_3(#1.  
, #2.  
, #3.  
, #4.  
)”]

[Ded<sub>4</sub>(x, y, z, u)  $\xrightarrow{\text{tex}}$  “  
Ded\_4(#1.  
, #2.  
, #3.  
, #4.  
)”]

[Ded<sub>4</sub><sup>\*</sup>(x, y, z, u)  $\xrightarrow{\text{tex}}$  “  
Ded\_4^\*(#1.  
, #2.  
, #3.  
, #4.  
)”]

[Ded<sub>5</sub>(x, y, z)  $\xrightarrow{\text{tex}}$  “  
Ded\_5(#1.  
, #2.  
, #3.  
)”]

[Ded<sub>6</sub>(p, c, e, b)  $\xrightarrow{\text{tex}}$  “  
Ded\_6(#1.  
, #2.  
)”]

, #3.  
 , #4.  
 )”]

[Ded<sub>6</sub><sup>\*</sup>(p, c, e, b)  $\xrightarrow{\text{tex}}$  “  
 Ded\_6^\*(#1.  
 , #2.  
 , #3.  
 , #4.  
 )”]

[Ded<sub>7</sub>(p)  $\xrightarrow{\text{tex}}$  “  
 Ded\_7(#1.  
 )”]

[Ded<sub>8</sub>(p, b)  $\xrightarrow{\text{tex}}$  “  
 Ded\_8(#1.  
 , #2.  
 )”]

[Ded<sub>8</sub><sup>\*</sup>(p, b)  $\xrightarrow{\text{tex}}$  “  
 Ded\_8^\*(#1.  
 , #2.  
 )”]

[Begin b;l : End; p  $\xrightarrow{\text{tex}}$  “  
 \newline \makebox [0.1\textwidth]{}%  
 \parbox [b]{0.4\textwidth }{\raggedright  
 \setlength {\parindent }{-0.1\textwidth }%  
 \makebox [0.1\textwidth ][l]{\$  
 \if \relax \cname lgwproofline\endcsname L\_? \else  
 \global \advance \lgwproofline by 1  
 L\ifnum \lgwproofline <10 0\fi \number \lgwproofline  
 \fi  
 \$:}\$Block {} \gg {}\$}\quad  
 \parbox [t]{0.4\textwidth }{\$Begin  
 \$\hfill \makebox [0mm][l]{\quad ;}}#1.  
 \newline \makebox [0.1\textwidth]{}%  
 \parbox [b]{0.4\textwidth }{\raggedright  
 \setlength {\parindent }{-0.1\textwidth }%  
 \makebox [0.1\textwidth ][l]{\$#2.  
 \$:}\$Block {} \gg {}\$}\quad  
 \parbox [t]{0.4\textwidth }{\$End  
 \$\hfill \makebox [0mm][l]{\quad ;}}#3.”]

[Begin b;l : End; p  $\xrightarrow{\text{name}}$  “  
 Begin \, #1.

; #2.  
: End ; #3.”]

[Last block line a  $\gg$  i;  $\xrightarrow{\text{tex}}$  “  
 $\backslash$ newline  $\backslash$ makebox [0.1 $\backslash$ textwidth]{}%  
 $\backslash$ parbox [b]{0.4 $\backslash$ textwidth }{\raggedright  
 $\backslash$ setlength {\parindent }{-0.1 $\backslash$ textwidth }%  
 $\backslash$ makebox [0.1 $\backslash$ textwidth ][l]{ $\$$   
 $\backslash$ if  $\backslash$ relax  $\backslash$ csname lgwproofline $\backslash$ endcsname L-?  $\backslash$ else  
 $\backslash$ global  $\backslash$ advance  $\backslash$ lgwproofline by 1  
L\ifnum  $\backslash$ lgwproofline <10 0\fi  $\backslash$ number  $\backslash$ lgwproofline  
 $\backslash$ fi  
 $\$$ :} $\$$ #1.  
{ }\gg { }\\$}\quad  
 $\backslash$ parbox [t]{0.4 $\backslash$ textwidth }{ $\$$ #2.  
 $\$$ \hfill  $\backslash$ makebox [0mm][l]{\quad ;}}”]  
[Last block line a  $\gg$  i;  $\xrightarrow{\text{name}}$  “  
Last\ block\ line \, #1.  
 $\backslash$ gg #2.  
 $\backslash$ , ;”]

[ $x \supseteq y \xrightarrow{\text{tex}}$  “#1.  
 $\backslash$ unrhd #2.”]

[Prop 3.2a  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2a”]

[Prop 3.2b  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2b”]

[Prop 3.2c  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2c”]

[Prop 3.2d  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2d”]

[Prop 3.2e<sub>1</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2e\_1”]

[Prop 3.2e<sub>2</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2e\_2”]

[Prop 3.2e  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2e”]

[Prop 3.2f<sub>1</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2f\_1”]

[Prop 3.2f<sub>2</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2f\_2”]

[Prop 3.2f  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2f”]

[Prop 3.2g<sub>1</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2g\_1”]

[Prop 3.2g<sub>2</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2g\_2”]

[Prop 3.2g  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2g”]

[Prop 3.2h<sub>1</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2h\_1”]

[Prop 3.2h<sub>2</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2h\_2”]

[Prop 3.2h  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.2h”]

[MacroIndent(x)  $\xrightarrow{\text{tex}}$  “  
\$%  
\leftskip=1em%  
\$#1.”]

[MacroIndent(x)  $\xrightarrow{\text{name}}$  “  
MacroIndent(#1.  
)”]

[Block<sub>1</sub>(t, s, c)  $\xrightarrow{\text{tex}}$  “  
Block\_1(#1.  
, #2.  
, #3.  
)”]

[Block<sub>2</sub>(b)  $\xrightarrow{\text{tex}}$  “  
Block\_2(#1.  
)”]

[ $\xrightarrow{\text{tex}}$  “  
\rightarrow ”]



$[g \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{g}\text{”}]$   
 $[h \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{h}\text{”}]$   
 $[i \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{i}\text{”}]$   
 $[j \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{j}\text{”}]$   
 $[k \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{k}\text{”}]$   
 $[l \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{l}\text{”}]$   
 $[m \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{m}\text{”}]$   
 $[n \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{n}\text{”}]$   
 $[o \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{o}\text{”}]$   
 $[p \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{p}\text{”}]$   
 $[q \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{q}\text{”}]$   
 $[r \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{r}\text{”}]$   
 $[s \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{s}\text{”}]$   
 $[t \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{t}\text{”}]$   
 $[u \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{u}\text{”}]$   
 $[v \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{v}\text{”}]$   
 $[w \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{w}\text{”}]$   
 $[x \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{x}\text{”}]$   
 $[y \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{y}\text{”}]$   
 $[z \xrightarrow{\text{tex}} \text{“} ]$   
 $\backslash\mathit{z}\text{”}]$



## 4 Priority table

[check  $\xrightarrow{\text{prio}}$

### Preassociative

[check], [base], [bracket \* end bracket], [big bracket \* end bracket], [ \$ \* \$ ],  
**[flush left \*]**, [x], [y], [z], [[\*  $\bowtie$  \*]], [[\*  $\xrightarrow{*}$  \*]], [pyk], [tex], [name], [prio], [\*], [T],  
 [if(\*, \*, \*)], [[\*  $\xrightarrow{*}$  \*]], [val], [claim], [ $\perp$ ], [f(\*)], [(\*)<sup>†</sup>], [F], [0], [1], [2], [3], [4], [5], [6],  
 [7], [8], [9], [0], [1], [2], [3], [4], [5], [6], [7], [8], [9], [a], [b], [c], [d], [e], [f], [g], [h], [i], [j],  
 [k], [l], [m], [n], [o], [p], [q], [r], [s], [t], [u], [v], [w], [(\*)<sup>M</sup>], [If(\*, \*, \*)],  
 [array{\*} \* end array], [l], [c], [r], [empty], [( \* | \* := \* )], [ $\mathcal{M}(*, *)$ ], [ $\tilde{\mathcal{U}}(*, *)$ ], [ $\mathcal{U}(*, *)$ ],  
 [ $\mathcal{U}^M(*, *)$ ], [**apply**(\*, \*)], [**apply**<sub>1</sub>(\*, \*)], [identifier(\*)], [identifier<sub>1</sub>(\*, \*)], [array-  
 plus(\*, \*)], [array-remove(\*, \*, \*)], [array-put(\*, \*, \*, \*)], [array-add(\*, \*, \*, \*, \*)],  
 [bit(\*, \*)], [bit<sub>1</sub>(\*, \*)], [rack], ["vector"], ["bibliography"], ["dictionary"],  
 ["body"], ["codex"], ["expansion"], ["code"], ["cache"], ["diagnose"], ["pyk"],  
 ["tex"], ["texname"], ["value"], ["message"], ["macro"], ["definition"],  
 ["unpack"], ["claim"], ["priority"], ["lambda"], ["apply"], ["true"], ["if"],  
 ["quote"], ["proclaim"], ["define"], ["introduce"], ["hide"], ["pre"], ["post"],  
 [ $\mathcal{E}(*, *, *)$ ], [ $\mathcal{E}_2(*, *, *, *)$ ], [ $\mathcal{E}_3(*, *, *, *)$ ], [ $\mathcal{E}_4(*, *, *, *)$ ], [**lookup**(\*, \*, \*)],  
 [**abstract**(\*, \*, \*, \*)], [[\*]], [ $\mathcal{M}(*, *, *)$ ], [ $\mathcal{M}_2(*, *, *, *)$ ], [ $\mathcal{M}^*(*, *, *)$ ], [macro],  
 [s<sub>0</sub>], [**zip**(\*, \*)], [**assoc**<sub>1</sub>(\*, \*, \*)], [(\*)<sup>P</sup>], [self], [[\*  $\doteq$  \*]], [[\*  $\dot{=}$  \*]], [[\*  $\dot{=}$  \*]],  
 [[\*  $\stackrel{\text{pyk}}{=}$  \*]], [[\*  $\stackrel{\text{tex}}{=}$  \*]], [[\*  $\stackrel{\text{name}}{=}$  \*]], [**Priority table**[\*]], [ $\tilde{\mathcal{M}}_1$ ], [ $\tilde{\mathcal{M}}_2(*, *)$ ], [ $\tilde{\mathcal{M}}_3(*, *)$ ],  
 [ $\tilde{\mathcal{M}}_4(*, *, *, *)$ ], [ $\mathcal{M}(*, *, *)$ ], [ $\mathcal{Q}(*, *, *)$ ], [ $\tilde{\mathcal{Q}}_2(*, *, *)$ ], [ $\tilde{\mathcal{Q}}_3(*, *, *, *)$ ], [ $\tilde{\mathcal{Q}}^*(*, *, *, *)$ ],  
 [(\*)], [(\*)], [display(\*)], [statement(\*)], [(\*)], [(\*)<sup>-</sup>], [**aspect**(\*, \*)],  
 [**aspect**(\*, \*, \*)], [(\*)], [**tuple**<sub>1</sub>(\*)], [**tuple**<sub>2</sub>(\*)], [let<sub>2</sub>(\*, \*)], [let<sub>1</sub>(\*, \*)],  
 [[\*  $\stackrel{\text{claim}}{=}$  \*]], [checker], [**check**(\*, \*)], [**check**<sub>2</sub>(\*, \*, \*)], [**check**<sub>3</sub>(\*, \*, \*)],  
 [**check**<sup>\*</sup>(\*, \*)], [**check**<sub>2</sub><sup>\*</sup>(\*, \*, \*)], [(\*)], [(\*)<sup>-</sup>], [(\*)<sup>o</sup>], [msg], [[\*  $\stackrel{\text{msg}}{=}$  \*]], [<stmt>],  
 [stmt], [[\*  $\stackrel{\text{stmt}}{=}$  \*]], [HeadNil'], [HeadPair'], [Transitivity'], [ $\perp$ ], [Contra'], [T<sub>E</sub>'],  
 [L<sub>1</sub>], [x], [A], [B], [C], [D], [E], [F], [G], [H], [I], [J], [K], [L], [M], [N], [O], [P], [Q],  
 [R], [S], [T], [U], [V], [W], [X], [Y], [Z], [( \* | \* := \* )], [( \* | \* := \* )], [∅], [Remainder],  
 [(\*)<sup>v</sup>], [intro(\*, \*, \*, \*)], [intro(\*, \*, \*)], [error(\*, \*)], [error<sub>2</sub>(\*, \*)], [proof(\*, \*, \*)],  
 [proof<sub>2</sub>(\*, \*)], [S(\*, \*)], [S<sup>†</sup>(\*, \*)], [S<sup>▷</sup>(\*, \*)], [S<sub>1</sub><sup>▷</sup>(\*, \*, \*)], [S<sup>E</sup>(\*, \*)], [S<sub>1</sub><sup>E</sup>(\*, \*, \*)],  
 [S<sup>+</sup>(\*, \*)], [S<sub>1</sub><sup>+</sup>(\*, \*, \*)], [S<sup>-</sup>(\*, \*)], [S<sub>1</sub><sup>-</sup>(\*, \*, \*)], [S<sup>\*</sup>(\*, \*)], [S<sub>1</sub><sup>\*</sup>(\*, \*, \*)],  
 [S<sub>2</sub><sup>\*</sup>(\*, \*, \*, \*)], [S<sup>⊗</sup>(\*, \*)], [S<sub>1</sub><sup>⊗</sup>(\*, \*, \*, \*)], [S<sup>†</sup>(\*, \*)], [S<sub>1</sub><sup>†</sup>(\*, \*, \*, \*)], [S<sup>⊞</sup>(\*, \*)],  
 [S<sub>1</sub><sup>⊞</sup>(\*, \*, \*, \*)], [S<sup>i.e.</sup>(\*, \*)], [S<sub>1</sub><sup>i.e.</sup>(\*, \*, \*, \*)], [S<sub>2</sub><sup>i.e.</sup>(\*, \*, \*, \*, \*)], [S<sup>v</sup>(\*, \*)],  
 [S<sub>1</sub><sup>v</sup>(\*, \*, \*, \*)], [S<sup>·</sup>(\*, \*)], [S<sub>1</sub><sup>·</sup>(\*, \*, \*, \*)], [S<sub>2</sub><sup>·</sup>(\*, \*, \*, \*, \*)], [T(\*)], [claims(\*, \*, \*)],  
 [claims<sub>2</sub>(\*, \*, \*)], [<proof>], [proof], [[**Lemma** \* : \*]], [[**Proof of** \* : \*]],  
 [[\* **lemma** \* : \*]], [[\* **antilemma** \* : \*]], [[\* **rule** \* : \*]], [[\* **antirule** \* : \*]],  
 [verifier], [V<sub>1</sub>(\*)], [V<sub>2</sub>(\*, \*)], [V<sub>3</sub>(\*, \*, \*, \*)], [V<sub>4</sub>(\*, \*)], [V<sub>5</sub>(\*, \*, \*, \*)], [V<sub>6</sub>(\*, \*, \*, \*)],  
 [V<sub>7</sub>(\*, \*, \*, \*)], [Cut(\*, \*)], [Head<sub>⊕</sub>(\*)], [Tail<sub>⊕</sub>(\*)], [rule<sub>1</sub>(\*, \*)], [rule(\*, \*)],  
 [Rule tactic], [Plus(\*, \*)], [[**Theory** \*]], [theory<sub>2</sub>(\*, \*)], [theory<sub>3</sub>(\*, \*)],  
 [theory<sub>4</sub>(\*, \*, \*)], [HeadNil''], [HeadPair''], [Transitivity''], [Contra''], [HeadNil],  
 [HeadPair], [Transitivity], [Contra], [T<sub>E</sub>], [ragged right],  
 [ragged right expansion ], [parm(\*, \*, \*)], [parm<sup>\*</sup>(\*, \*, \*)], [inst(\*, \*)],  
 [inst<sup>\*</sup>(\*, \*)], [occur(\*, \*, \*)], [occur<sup>\*</sup>(\*, \*, \*)], [unify(\* = \*, \*)], [unify<sup>\*</sup>(\* = \*, \*)],

[unify<sub>2</sub>(\* = \*, \*)], [L<sub>a</sub>], [L<sub>b</sub>], [L<sub>c</sub>], [L<sub>d</sub>], [L<sub>e</sub>], [L<sub>f</sub>], [L<sub>g</sub>], [L<sub>h</sub>], [L<sub>i</sub>], [L<sub>j</sub>], [L<sub>k</sub>], [L<sub>l</sub>], [L<sub>m</sub>], [L<sub>n</sub>], [L<sub>o</sub>], [L<sub>p</sub>], [L<sub>q</sub>], [L<sub>r</sub>], [L<sub>s</sub>], [L<sub>t</sub>], [L<sub>u</sub>], [L<sub>v</sub>], [L<sub>w</sub>], [L<sub>x</sub>], [L<sub>y</sub>], [L<sub>z</sub>], [L<sub>A</sub>], [L<sub>B</sub>], [L<sub>C</sub>], [L<sub>D</sub>], [L<sub>E</sub>], [L<sub>F</sub>], [L<sub>G</sub>], [L<sub>H</sub>], [L<sub>I</sub>], [L<sub>J</sub>], [L<sub>K</sub>], [L<sub>L</sub>], [L<sub>M</sub>], [L<sub>N</sub>], [L<sub>O</sub>], [L<sub>P</sub>], [L<sub>Q</sub>], [L<sub>R</sub>], [L<sub>S</sub>], [L<sub>T</sub>], [L<sub>U</sub>], [L<sub>V</sub>], [L<sub>W</sub>], [L<sub>X</sub>], [L<sub>Y</sub>], [L<sub>Z</sub>], [L<sub>?</sub>], [Reflexivity], [Reflexivity<sub>1</sub>], [Commutativity], [Commutativity<sub>1</sub>], [<tactic>], [tactic], [[\* <sup>tactic</sup>≡ \*]], [P(\*, \*, \*)], [P\*(\*, \*, \*)], [p<sub>0</sub>], [conclude<sub>1</sub>(\*, \*)], [conclude<sub>2</sub>(\*, \*, \*)], [conclude<sub>3</sub>(\*, \*, \*, \*)], [conclude<sub>4</sub>(\*, \*)], [[\* <sup>o</sup>≡ \*]], [RootVisible(\*)], [A], [R], [C], [T], [L], [{\*}], [̄\*], [a], [b], [c], [d], [e], [f], [g], [h], [i], [j], [k], [l], [m], [n], [o], [p], [q], [r], [s], [t], [u], [v], [w], [x], [y], [z], [{\*≡\* | \* :=\*}], [{\*≡<sup>0</sup>\* | \* :=\*}], [{\*≡<sup>1</sup>\* | \* :=\*}], [{\*≡\* \* | \* :=\*}], [Ded(\*, \*)], [Ded<sub>0</sub>(\*, \*)], [Ded<sub>1</sub>(\*, \*, \*)], [Ded<sub>2</sub>(\*, \*, \*)], [Ded<sub>3</sub>(\*, \*, \*, \*)], [Ded<sub>4</sub>(\*, \*, \*, \*)], [Ded<sub>4</sub><sup>\*</sup>(\*, \*, \*, \*)], [Ded<sub>5</sub>(\*, \*, \*)], [Ded<sub>6</sub>(\*, \*, \*, \*)], [Ded<sub>6</sub><sup>\*</sup>(\*, \*, \*, \*)], [Ded<sub>7</sub>(\*)], [Ded<sub>8</sub>(\*, \*)], [Ded<sub>8</sub><sup>\*</sup>(\*, \*)], [S], [Neg], [MP], [Gen], [Ded], [S1], [S2], [S3], [S4], [S5], [S6], [S7], [S8], [S9], [Repetition], [A1'], [A2'], [A4'], [A5'], [Prop 3.2a], [Prop 3.2b], [Prop 3.2c], [Prop 3.2d], [Prop 3.2e<sub>1</sub>], [Prop 3.2e<sub>2</sub>], [Prop 3.2e], [Prop 3.2f<sub>1</sub>], [Prop 3.2f<sub>2</sub>], [Prop 3.2f], [Prop 3.2g<sub>1</sub>], [Prop 3.2g<sub>2</sub>], [Prop 3.2g], [Prop 3.2h<sub>1</sub>], [Prop 3.2h<sub>2</sub>], [Prop 3.2h], [Block<sub>1</sub>(\*, \*, \*)], [Block<sub>2</sub>(\*)];

### Preassociative

[\*-{\*}], [\* /indexintro(\*, \*, \*, \*)], [\* /intro(\*, \*, \*)], [\* /bothintro(\*, \*, \*, \*, \*)], [\* /nameintro(\*, \*, \*, \*)], [\*'], [\* [\* ]], [\* [\* → \*]], [\* [\* ⇒ \*]], [\* 0], [\* 1], [0b], [\* -color(\*)], [\* -color\*(\*)], [\*<sup>H</sup>], [\*<sup>T</sup>], [\*<sup>U</sup>], [\*<sup>h</sup>], [\*<sup>t</sup>], [\*<sup>s</sup>], [\*<sup>c</sup>], [\*<sup>d</sup>], [\*<sup>a</sup>], [\*<sup>C</sup>], [\*<sup>M</sup>], [\*<sup>B</sup>], [\*<sup>r</sup>], [\*<sup>i</sup>], [\*<sup>d</sup>], [\*<sup>R</sup>], [\*<sup>0</sup>], [\*<sup>1</sup>], [\*<sup>2</sup>], [\*<sup>3</sup>], [\*<sup>4</sup>], [\*<sup>5</sup>], [\*<sup>6</sup>], [\*<sup>7</sup>], [\*<sup>8</sup>], [\*<sup>9</sup>], [\*<sup>E</sup>], [\*<sup>ℳ</sup>], [\*<sup>C</sup>], [\*<sup>C\*</sup>], [\*<sup>hide</sup>];

### Preassociative

[“ \* ”], [], [(\*)<sup>t</sup>], [string(\*) + \*], [string(\*) ++ \*], [\*], [ \* ], [! \*], [“ \* ”], [# \*], [\$ \*], [% \*], [& \*], [’ \*], [(\*)], [() \*], [\*\*], [+ \*], [ \* ], [- \*], [ . \* ], [ / \* ], [0 \*], [1 \*], [2 \*], [3 \*], [4 \*], [5 \*], [6 \*], [7 \*], [8 \*], [9 \*], [: \*], [; \*], [< \*], [= \*], [> \*], [? \*], [ @ \* ], [A \*], [B \*], [C \*], [D \*], [E \*], [F \*], [G \*], [H \*], [I \*], [J \*], [K \*], [L \*], [M \*], [N \*], [O \*], [P \*], [Q \*], [R \*], [S \*], [T \*], [U \*], [V \*], [W \*], [X \*], [Y \*], [Z \*], [ [ \* ], [ \ \* ], [ ] \* ], [ ^ \* ], [ \_ \* ], [ ‘ \* ], [ a \* ], [ b \* ], [ c \* ], [ d \* ], [ e \* ], [ f \* ], [ g \* ], [ h \* ], [ i \* ], [ j \* ], [ k \* ], [ l \* ], [ m \* ], [ n \* ], [ o \* ], [ p \* ], [ q \* ], [ r \* ], [ s \* ], [ t \* ], [ u \* ], [ v \* ], [ w \* ], [ x \* ], [ y \* ], [ z \* ], [ { \* }, [ | \* }, [ } \* ], [ ~ \* ], [Preassociative \*; \*], [Postassociative \*; \*], [[\*], \*], [priority \* end], [newline \*], [macro newline \*], [MacroIndent(\*)];

### Preassociative

[\* ’ \*], [\* ‘ \*];

### Preassociative

[\*’];

### Preassociative

[\* · \*], [\* · 0 \*];

### Preassociative

[\* + \*], [\* + 0 \*], [\* + 1 \*], [\* - \*], [\* - 0 \*], [\* - 1 \*];

### Preassociative

[\* ∪ {\*}], [\* ∪ \*], [\* \ {\*}];

### Postassociative

[\* . : \*], [\* . : \*], [\* : : \*], [\* + 2 \* \*], [\* : : \*], [\* + 2 \* \*];

### Postassociative

[\*, \*];

### Preassociative

[\*  $\overset{B}{\sim}$  \*], [\*  $\overset{D}{\sim}$  \*], [\*  $\overset{C}{\sim}$  \*], [\*  $\overset{P}{\sim}$  \*], [\*  $\sim$  \*], [\* = \*], [\*  $\rightarrow$  \*], [\*  $\overset{t}{=}$  \*], [\*  $\overset{t^*}{=}$  \*], [\*  $\overset{r}{=}$  \*],  
[\*  $\in_t$  \*], [\*  $\subseteq_T$  \*], [\*  $\overset{T}{=}$  \*], [\*  $\overset{s}{=}$  \*], [\* free in \*], [\* free in\* \*], [\* free for \* in \*],  
[\* free for\* \* in \*], [\*  $\in_c$  \*], [\* < \*], [\* <' \*], [\*  $\leq'$  \*], [\* = \*], [\*  $\neq$  \*], [\*<sup>var</sup>],  
[\*<sup>0</sup> \*], [\*<sup>1</sup> \*], [\*<sup>!</sup> \*];

### Preassociative

[ $\neg$ \*];

### Preassociative

[\*  $\wedge$  \*], [\*  $\overset{\sim}{\wedge}$  \*], [\*  $\overset{\sim}{\wedge}$  \*], [\*  $\wedge_c$  \*];

### Preassociative

[\*  $\vee$  \*], [\*  $\parallel$  \*], [\*  $\overset{\sim}{\vee}$  \*];

### Preassociative

[ $\exists$ \*: \*], [ $\forall$ \*: \*], [ $\forall_{\text{obj}}$ \*: \*];

### Postassociative

[\*  $\overset{\sim}{\Rightarrow}$  \*], [\*  $\Rightarrow$  \*], [\*  $\Leftrightarrow$  \*];

### Postassociative

[\* : \*], [\* spy \*], [\*!\*];

### Preassociative

[\*  $\left\{ \begin{array}{c} * \\ * \end{array} \right.$ ];

### Preassociative

[ $\lambda$  \* .\*], [ $\Lambda$  \* .\*], [ $\Lambda$ \*], [if \* then \* else \*], [let \* = \* in \*], [let \*  $\overset{\sim}{=}$  \* in \*];

### Preassociative

[\*#\*];

### Preassociative

[\*<sup>I</sup>], [\*<sup>\triangleright</sup>], [\*<sup>V</sup>], [\*<sup>+</sup>], [\*<sup>-</sup>], [\*<sup>\*</sup>];

### Preassociative

[\* @ \*], [\*  $\triangleright$  \*], [\*  $\triangleright$  \*], [\*  $\gg$  \*], [\*  $\triangleright$  \*];

### Postassociative

[\*  $\vdash$  \*], [\*  $\vdash$  \*], [\* i.e. \*];

### Preassociative

[ $\forall$ \*: \*], [ $\Pi$ \*: \*];

### Postassociative

[\*  $\oplus$  \*];

### Postassociative

[\*; \*];

### Preassociative

[\* proves \*];

### Preassociative

[\* **proof of** \* : \*], [Line \* : \*  $\gg$  \*; \*], [Last line \*  $\gg$  \*  $\square$ ],  
[Line \* : Premise  $\gg$  \*; \*], [Line \* : Side-condition  $\gg$  \*; \*], [Arbitrary  $\gg$  \*; \*],  
[Local  $\gg$  \* = \*; \*], [Begin \*; \* : End; \*], [Last block line \*  $\gg$  \*; \*],  
[Arbitrary  $\gg$  \*; \*];

### Postassociative

[\* | \*];

**Postassociative**

[\* , \*], [\* [\* ]\*];

**Preassociative**

[\*&\*, [→];

**Preassociative**

[\*\\\*], [\* linebreak[4] \*], [\*\\\*];]