

# Logiweb codex of pok

## Up Help

pok, [ $\overset{\circ}{*}$ ], RootVisible(\*), A, R, C, T, L, {\*},  $\bar{*}$ , 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,  $\langle * \equiv * \mid * := * \rangle$ ,  $\langle * \equiv^0 * \mid * := * \rangle$ ,  $\langle * \equiv^1 * \mid * := * \rangle$ ,  $\langle * \equiv^* * \mid * := * \rangle$ , 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, rule div, Ded, S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, 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, Prop 3.2i, Prop 3.2j<sub>1</sub>, Prop 3.2j<sub>2</sub>, Prop 3.2j, Prop 3.2k<sub>1</sub>, Prop 3.2k<sub>2</sub>, Prop 3.2k, Prop 3.2l<sub>1</sub>, Prop 3.2l<sub>2</sub>, Prop 3.2l, Prop 3.2m<sub>1</sub>, Prop 3.2m<sub>2</sub>, Prop 3.2m, Prop 3.2n<sub>1</sub>, Prop 3.2n<sub>2</sub>, Prop 3.2n, Prop 3.2o, Prop 3.4a<sub>1</sub>, Prop 3.4a<sub>2</sub>, Prop 3.4a, Prop 3.4b, Prop 3.4c<sub>1</sub>, Prop 3.4c<sub>2</sub>, Prop 3.4c, Prop 3.4d<sub>1</sub>, Prop 3.4d<sub>2</sub>, Prop 3.4d, Block<sub>1</sub>(\*, \*, \*), Block<sub>2</sub>(\*), \*<sup>hide</sup>, MacroIndent(\*), \*', \* = \*, \* ≠ \*, \*<sup>var</sup>, \*#<sup>0</sup>\*, \*#<sup>1</sup>\*, \*#<sup>\*</sup>\*,  $\exists *: *$ ,  $\forall *: *$ ,  $\forall_{obj} *: *$ , \* ⇒ \*, \* ⇔ \*, \*##\*, \* ⊇ \*,  $\Pi *: *$ , Begin\*; \*: End\*; Last block line \* >> \*; Arbitrary >> \*; \* | \*, →, \* \ \\*, \*!\*,

## pok

[pok <sup>prio</sup> →

### Preassociative

[pok], [base], [bracket \* end bracket], [big bracket \* end bracket], [ \$ \* \$ ], [flush left [\*], [x], [y], [z], [[\* ∞ \*]], [[\* → \*]], [pyk], [tex], [name], [prio], [\*], [T], [if(\*, \*, \*)], [[\* ⇒ \*]], [val], [claim], [⊥], [f(\*)], [(\*)<sup>l</sup>], [F], [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], [so], [zip(\*, \*)], [assoc<sub>1</sub>(\*, \*, \*)], [(\*)<sup>P</sup>], [self], [[\* ≐ \*]], [[\* ≐ \*]], [[\* ≐ \*]],

$[[* \stackrel{\text{pyk}}{=} *]], [[* \stackrel{\text{tex}}{=} *]], [[* \stackrel{\text{name}}{=} *]], [\mathbf{Priority\ table}], [\tilde{\mathcal{M}}_1], [\tilde{\mathcal{M}}_2(*)], [\tilde{\mathcal{M}}_3(*)],$   
 $[\tilde{\mathcal{M}}_4(*, *, *, *)], [\mathcal{M}(*, *, *)], [\tilde{\mathcal{Q}}_2(*, *, *)], [\tilde{\mathcal{Q}}_3(*, *, *, *)], [\tilde{\mathcal{Q}}^*(*, *, *)],$   
 $[(*)], [(*)], [\text{display}(*)], [\text{statement}(*)], [(*)], [(*)], [\mathbf{aspect}(*, *)],$   
 $[\mathbf{aspect}(*, *, *)], [(\ast)], [\mathbf{tuple}_1(*)], [\mathbf{tuple}_2(*)], [\text{let}_2(*, *)], [\text{let}_1(*, *)],$   
 $[[* \stackrel{\text{claim}}{=} *]], [\text{checker}], [\mathbf{check}(*, *)], [\mathbf{check}_2(*, *, *)], [\mathbf{check}_3(*, *, *)],$   
 $[\mathbf{check}^*(*, *)], [\mathbf{check}_2^*(*, *, *)], [(*)], [(*)], [(*)], [\text{msg}], [[* \stackrel{\text{msg}}{=} *]], [<\text{stmt}>],$   
 $[\text{stmt}], [[* \stackrel{\text{stmt}}{=} *]], [\text{HeadNil}'], [\text{HeadPair}'], [\text{Transitivity}'], [\perp], [\text{Contra}'], [\mathbf{T}_E],$   
 $[\mathbf{L}_1], [\mathbf{L}_2], [\mathbf{A}], [\mathbf{B}], [\mathbf{C}], [\mathbf{D}], [\mathbf{E}], [\mathbf{F}], [\mathbf{G}], [\mathbf{H}], [\mathbf{I}], [\mathbf{J}], [\mathbf{K}], [\mathbf{L}], [\mathbf{M}], [\mathbf{N}], [\mathbf{O}], [\mathbf{P}], [\mathbf{Q}],$   
 $[\mathbf{R}], [\mathbf{S}], [\mathbf{T}], [\mathbf{U}], [\mathbf{V}], [\mathbf{W}], [\mathbf{X}], [\mathbf{Y}], [\mathbf{Z}], [(*) \mid * := *], [(*) \mid * := *], [\emptyset], [\text{Remainder}],$   
 $[(*)^\vee], [\text{intro}(*, *, *, *)], [\text{intro}(*, *, *)], [\text{error}(*, *)], [\text{error}_2(*, *)], [\text{proof}(*, *, *)],$   
 $[\text{proof}_2(*, *)], [\mathbf{S}(*, *)], [\mathbf{S}^1(*, *)], [\mathbf{S}^\triangleright(*, *)], [\mathbf{S}_1^\triangleright(*, *, *)], [\mathbf{S}^E(*, *)], [\mathbf{S}_1^E(*, *, *)],$   
 $[\mathbf{S}^+(*, *)], [\mathbf{S}_1^+(*, *, *)], [\mathbf{S}^-(*, *)], [\mathbf{S}_1^-(*, *, *)], [\mathbf{S}^*(*, *)], [\mathbf{S}_1^*(*, *, *)],$   
 $[\mathbf{S}_2^*(*, *, *, *)], [\mathbf{S}^\otimes(*, *)], [\mathbf{S}_1^\otimes(*, *, *)], [\mathbf{S}^\mp(*, *)], [\mathbf{S}_1^\mp(*, *, *, *)], [\mathbf{S}^\pm(*, *)],$   
 $[\mathbf{S}_1^\pm(*, *, *, *)], [\mathbf{S}^{\text{i.e.}}(*, *)], [\mathbf{S}_1^{\text{i.e.}}(*, *, *, *)], [\mathbf{S}_2^{\text{i.e.}}(*, *, *, *, *)], [\mathbf{S}^\vee(*, *)],$   
 $[\mathbf{S}_1^\vee(*, *, *, *)], [\mathbf{S}^i(*, *)], [\mathbf{S}_1^i(*, *, *, *)], [\mathbf{S}_2^i(*, *, *, *, *)], [\mathbf{T}(*)], [\text{claims}(*, *, *)],$   
 $[\text{claims}_2(*, *, *)], [<\text{proof}>], [\text{proof}], [[\mathbf{Lemma} \ * : *]], [[\mathbf{Proof\ of} \ * : *]],$   
 $[[* \ \mathbf{lemma} \ * : *]], [[* \ \mathbf{antilemma} \ * : *]], [[* \ \mathbf{rule} \ * : *]], [[* \ \mathbf{antirule} \ * : *]],$   
 $[\text{verifier}], [\mathbf{V}_1(*)], [\mathbf{V}_2(*, *)], [\mathbf{V}_3(*, *, *, *)], [\mathbf{V}_4(*, *)], [\mathbf{V}_5(*, *, *, *)], [\mathbf{V}_6(*, *, *, *)],$   
 $[\mathbf{V}_7(*, *, *, *)], [\text{Cut}(*, *)], [\text{Head}_\oplus(*)], [\text{Tail}_\oplus(*)], [\text{rule}_1(*, *)], [\text{rule}(*, *)],$   
 $[\text{Rule\ tactic}], [\text{Plus}(*, *)], [[\mathbf{Theory} \ *]], [\text{theory}_2(*, *)], [\text{theory}_3(*, *)],$   
 $[\text{theory}_4(*, *, *)], [\text{HeadNil}''], [\text{HeadPair}''], [\text{Transitivity}''], [\text{Contra}''], [\text{HeadNil}],$   
 $[\text{HeadPair}], [\text{Transitivity}], [\text{Contra}], [\mathbf{T}_E], [\text{ragged\ right}],$   
 $[\text{ragged\ right\ expansion}], [\text{parm}(*, *, *)], [\text{parm}^*(*, *, *)], [\text{inst}(*, *)],$   
 $[\text{inst}^*(*, *)], [\text{occur}(*, *, *)], [\text{occur}^*(*, *, *)], [\text{unify}(* = *, *)], [\text{unify}^*(* = *, *)],$   
 $[\text{unify}_2(* = *, *)], [\mathbf{L}_a], [\mathbf{L}_b], [\mathbf{L}_c], [\mathbf{L}_d], [\mathbf{L}_e], [\mathbf{L}_f], [\mathbf{L}_g], [\mathbf{L}_h], [\mathbf{L}_i], [\mathbf{L}_j], [\mathbf{L}_k], [\mathbf{L}_l], [\mathbf{L}_m],$   
 $[\mathbf{L}_n], [\mathbf{L}_o], [\mathbf{L}_p], [\mathbf{L}_q], [\mathbf{L}_r], [\mathbf{L}_s], [\mathbf{L}_t], [\mathbf{L}_u], [\mathbf{L}_v], [\mathbf{L}_w], [\mathbf{L}_x], [\mathbf{L}_y], [\mathbf{L}_z], [\mathbf{L}_A], [\mathbf{L}_B], [\mathbf{L}_C],$   
 $[\mathbf{L}_D], [\mathbf{L}_E], [\mathbf{L}_F], [\mathbf{L}_G], [\mathbf{L}_H], [\mathbf{L}_I], [\mathbf{L}_J], [\mathbf{L}_K], [\mathbf{L}_L], [\mathbf{L}_M], [\mathbf{L}_N], [\mathbf{L}_O], [\mathbf{L}_P], [\mathbf{L}_Q], [\mathbf{L}_R],$   
 $[\mathbf{L}_S], [\mathbf{L}_T], [\mathbf{L}_U], [\mathbf{L}_V], [\mathbf{L}_W], [\mathbf{L}_X], [\mathbf{L}_Y], [\mathbf{L}_Z], [\mathbf{L}_?], [\text{Reflexivity}], [\text{Reflexivity}_1],$   
 $[\text{Commutativity}], [\text{Commutativity}_1], [<\text{tactic}>], [\text{tactic}], [[* \stackrel{\text{tactic}}{=} *]], [\mathcal{P}(*, *, *)],$   
 $[\mathcal{P}^*(*, *, *)], [\text{p}_0], [\text{conclude}_1(*, *)], [\text{conclude}_2(*, *, *)], [\text{conclude}_3(*, *, *, *)],$   
 $[\text{conclude}_4(*, *)], [[* \stackrel{\circ}{=} *]], [\text{RootVisible}(*)], [\mathbf{A}], [\mathbf{R}], [\mathbf{C}], [\mathbf{T}], [\mathbf{L}], [\{*\}], [\bar{*}], [a], [b],$   
 $[c], [d], [e], [f], [g], [h], [i], [j], [k], [l], [m], [n], [o], [p], [q], [r], [s], [t], [u], [v], [w], [x],$   
 $[y], [z], [(*) \equiv * \mid * := *], [(*) \equiv^0 * \mid * := *], [(*) \equiv^1 * \mid * := *], [(*) \equiv^* * \mid * := *],$   
 $[\text{Ded}(*, *)], [\text{Ded}_0(*, *)], [\text{Ded}_1(*, *, *)], [\text{Ded}_2(*, *, *)], [\text{Ded}_3(*, *, *, *)],$   
 $[\text{Ded}_4(*, *, *, *)], [\text{Ded}_4^*(*, *, *, *)], [\text{Ded}_5(*, *, *)], [\text{Ded}_6(*, *, *, *)],$   
 $[\text{Ded}_6^*(*, *, *, *)], [\text{Ded}_7(*, *)], [\text{Ded}_8(*, *)], [\text{Ded}_8^*(*, *)], [\mathbf{S}], [\mathbf{Neg}], [\mathbf{MP}], [\mathbf{Gen}],$   
 $[\text{rule\ div}], [\text{Ded}], [\mathbf{S}_1], [\mathbf{S}_2], [\mathbf{S}_3], [\mathbf{S}_4], [\mathbf{S}_5], [\mathbf{S}_6], [\mathbf{S}_7], [\mathbf{S}_8], [\mathbf{S}_9], [\mathbf{S}_{10}], [\text{Repetition}],$   
 $[\mathbf{A}1'], [\mathbf{A}2'], [\mathbf{A}4'], [\mathbf{A}5'], [\text{Prop\ 3.2a}], [\text{Prop\ 3.2b}], [\text{Prop\ 3.2c}], [\text{Prop\ 3.2d}],$   
 $[\text{Prop\ 3.2e}_1], [\text{Prop\ 3.2e}_2], [\text{Prop\ 3.2e}], [\text{Prop\ 3.2f}_1], [\text{Prop\ 3.2f}_2], [\text{Prop\ 3.2f}],$   
 $[\text{Prop\ 3.2g}_1], [\text{Prop\ 3.2g}_2], [\text{Prop\ 3.2g}], [\text{Prop\ 3.2h}_1], [\text{Prop\ 3.2h}_2], [\text{Prop\ 3.2h}],$   
 $[\text{Prop\ 3.2i}], [\text{Prop\ 3.2j}_1], [\text{Prop\ 3.2j}_2], [\text{Prop\ 3.2j}], [\text{Prop\ 3.2k}_1], [\text{Prop\ 3.2k}_2],$   
 $[\text{Prop\ 3.2k}], [\text{Prop\ 3.2l}_1], [\text{Prop\ 3.2l}_2], [\text{Prop\ 3.2l}], [\text{Prop\ 3.2m}_1], [\text{Prop\ 3.2m}_2],$   
 $[\text{Prop\ 3.2m}], [\text{Prop\ 3.2n}_1], [\text{Prop\ 3.2n}_2], [\text{Prop\ 3.2n}], [\text{Prop\ 3.2o}], [\text{Prop\ 3.4a}_1],$   
 $[\text{Prop\ 3.4a}_2], [\text{Prop\ 3.4a}], [\text{Prop\ 3.4b}], [\text{Prop\ 3.4c}_1], [\text{Prop\ 3.4c}_2], [\text{Prop\ 3.4c}],$

[Prop 3.4d<sub>1</sub>], [Prop 3.4d<sub>2</sub>], [Prop 3.4d], [Block<sub>1</sub>(\*, \*, \*)], [Block<sub>2</sub>(\*)];

### Preassociative

[\*\_ {\*}], [\*/indexintro(\*, \*, \*, \*)], [\*/intro(\*, \*, \*)], [\*/bothintro(\*, \*, \*, \*, \*)],  
[\*/nameintro(\*, \*, \*, \*)], [\*/], [\*[ \* ]], [\*[ \* → \* ]], [\*[ \* ⇒ \* ]], [\*[0]], [\*[1]], [0b], [\*-color(\*)],  
[\*-color\* (\*)], [\*\_H], [\*\_T], [\*\_U], [\*\_h], [\*\_t], [\*\_s], [\*\_c], [\*\_d], [\*\_a], [\*\_C], [\*\_M], [\*\_B], [\*\_r], [\*\_i],  
[\*\_d], [\*\_R], [\*\_0], [\*\_1], [\*\_2], [\*\_3], [\*\_4], [\*\_5], [\*\_6], [\*\_7], [\*\_8], [\*\_9], [\*\_E], [\*\_V], [\*\_C], [\*\_C\*],  
[\*\_hide];

### 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

[\* · \*], [\* ·<sub>0</sub> \*];

### Preassociative

[\* + \*], [\* +<sub>0</sub> \*], [\* +<sub>1</sub> \*], [\* - \*], [\* -<sub>0</sub> \*], [\* -<sub>1</sub> \*];

### Preassociative

[\* ∪ { \* }], [\* ∪ \*], [\* \ { \* }];

### Postassociative

[\* . : \*], [\* . :<sub>1</sub> \*], [\* . :<sub>2</sub> \*], [\* +<sub>2</sub> \*], [\* : : \*], [\* +<sub>2</sub> \* \*];

### Postassociative

[\*, \*];

### Preassociative

[\* <sup>B</sup> ≈ \*], [\* <sup>D</sup> ≈ \*], [\* <sup>C</sup> ≈ \*], [\* <sup>P</sup> ≈ \*], [\* ≈ \*], [\* = \*], [\* <sup>+</sup> \*], [\* <sup>t</sup> = \*], [\* <sup>t\*</sup> = \*], [\* <sup>r</sup> = \*],  
[\* ∈<sub>t</sub> \*], [\* ⊆<sub>T</sub> \*], [\* <sup>T</sup> = \*], [\* <sup>s</sup> = \*], [\* free in \*], [\* free in\* \*], [\* free for \* in \*],  
[\* free for\* \* in \*], [\* ∈<sub>c</sub> \*], [\* < \*], [\* <’ \*], [\* ≤’ \*], [\* = \*], [\* ≠ \*], [\*<sup>var</sup>],  
[\* #<sup>0</sup> \*], [\* #<sup>1</sup> \*], [\* #\* \*];

### Preassociative

[¬ \*];

### Preassociative

[\* ∧ \*], [\* <sup>Λ</sup> \*], [\* <sup>Λ</sup> \*], [\* ∧<sub>c</sub> \*];

### Preassociative

[\* ∨ \*], [\* || \*], [\* <sup>∨</sup> \*];

### Preassociative

[∃ \*; \*], [∀ \*; \*], [∀<sub>obj</sub> \*; \*];

### Postassociative

[\*  $\dot{=}$  \*], [\*  $\Rightarrow$  \*], [\*  $\Leftrightarrow$  \*];

**Postassociative**

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

**Preassociative**

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

**Preassociative**

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

**Preassociative**

[\*#\*];

**Preassociative**

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

**Preassociative**

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

**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**

[\*&\*], [ $\rightarrow$ ];

**Preassociative**

[\* $\backslash$ \*], [\* linebreak[4] \*], [\* $\backslash$ \*], [\*||\*];]

[pok  $\xrightarrow{\text{pyk}}$  "pok"]

[\*  $\overset{\circ}{=}$  \*]

[[x  $\overset{\circ}{=}$  y]  $\xrightarrow{\text{tex}}$  “

[#1/tex name/tex.

\stackrel{\circ}{=} {=}#2.

]”]

$[[* \stackrel{\circ}{=} *] \xrightarrow{\text{pyk}} \text{“general macro define " as " end define”}]$

RootVisible(\*)

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

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

$[\text{RootVisible}(*) \xrightarrow{\text{pyk}} \text{“make root visible " end visible”}]$

A

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

$[\text{A} \xrightarrow{\text{pyk}} \text{“sequent example axiom”}]$

R

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

$[\text{R} \xrightarrow{\text{pyk}} \text{“sequent example rule”}]$

C

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

$[\text{C} \xrightarrow{\text{pyk}} \text{“sequent example contradiction”}]$

T

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

$[\text{T} \xrightarrow{\text{pyk}} \text{“sequent example theory”}]$

**L**

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

[**L**  $\xrightarrow{\text{pyk}}$  “sequent example lemma”]

{\*}

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

[{\*}  $\xrightarrow{\text{pyk}}$  “set " end set”]

$\overline{*}$

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

[ $\overline{*}$   $\xrightarrow{\text{pyk}}$  “object var " end var”]

*a*

[*a*  $\xrightarrow{\text{macro}}$   $\lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[a \doteq \bar{a}]])$ ]

[*a*  $\xrightarrow{\text{tex}}$  “  
\mathit{a}”]

[*a*  $\xrightarrow{\text{pyk}}$  “object a”]

*b*

[*b*  $\xrightarrow{\text{macro}}$   $\lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[b \doteq \bar{b}]])$ ]

[*b*  $\xrightarrow{\text{tex}}$  “  
\mathit{b}”]

[*b*  $\xrightarrow{\text{pyk}}$  “object b”]

*c*

[*c*  $\xrightarrow{\text{macro}}$   $\lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[c \doteq \bar{c}]])$ ]

[ $c \xrightarrow{\text{tex}}$  “  
 $\backslash\mathit{c}$ ”]

[ $c \xrightarrow{\text{pyk}}$  “object c”]

*d*

[ $d \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[d \doteq \bar{d}]])$ ]

[ $d \xrightarrow{\text{tex}}$  “  
 $\backslash\mathit{d}$ ”]

[ $d \xrightarrow{\text{pyk}}$  “object d”]

*e*

[ $e \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[e \doteq \bar{e}]])$ ]

[ $e \xrightarrow{\text{tex}}$  “  
 $\backslash\mathit{e}$ ”]

[ $e \xrightarrow{\text{pyk}}$  “object e”]

*f*

[ $f \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[f \doteq \bar{f}]])$ ]

[ $f \xrightarrow{\text{tex}}$  “  
 $\backslash\mathit{f}$ ”]

[ $f \xrightarrow{\text{pyk}}$  “object f”]

*g*

[ $g \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[g \doteq \bar{g}]])$ ]

[ $g \xrightarrow{\text{tex}}$  “  
 $\backslash\mathit{g}$ ”]

[ $g \xrightarrow{\text{pyk}}$  “object g”]

*h*

[ $h \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[h \doteq \bar{h}]])$ ]

[ $h \xrightarrow{\text{tex}}$  “  
 $\backslash\text{mathit}\{h\}$ ”]

[ $h \xrightarrow{\text{pyk}}$  “object h”]

*i*

[ $i \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[i \doteq \bar{i}]])$ ]

[ $i \xrightarrow{\text{tex}}$  “  
 $\backslash\text{mathit}\{i\}$ ”]

[ $i \xrightarrow{\text{pyk}}$  “object i”]

*j*

[ $j \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[j \doteq \bar{j}]])$ ]

[ $j \xrightarrow{\text{tex}}$  “  
 $\backslash\text{mathit}\{j\}$ ”]

[ $j \xrightarrow{\text{pyk}}$  “object j”]

*k*

[ $k \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[k \doteq \bar{k}]])$ ]

[ $k \xrightarrow{\text{tex}}$  “  
 $\backslash\text{mathit}\{k\}$ ”]

[ $k \xrightarrow{\text{pyk}}$  “object k”]

*l*

[ $l \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[l \doteq \bar{l}]])$ ]

[ $l \xrightarrow{\text{tex}}$  “  
 $\backslash\text{mathit}\{l\}$ ”]

[ $l \xrightarrow{\text{pyk}}$  “object l”]



*m*

$[m \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[m \doteq \bar{m}]])]$

$[m \xrightarrow{\text{tex}} \text{“}\backslash\text{mathit}\{m\}\text{”}]$

$[m \xrightarrow{\text{pyk}} \text{“object } m\text{”}]$

*n*

$[n \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[n \doteq \bar{n}]])]$

$[n \xrightarrow{\text{tex}} \text{“}\backslash\text{mathit}\{n\}\text{”}]$

$[n \xrightarrow{\text{pyk}} \text{“object } n\text{”}]$

*o*

$[o \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[o \doteq \bar{o}]])]$

$[o \xrightarrow{\text{tex}} \text{“}\backslash\text{mathit}\{o\}\text{”}]$

$[o \xrightarrow{\text{pyk}} \text{“object } o\text{”}]$

*p*

$[p \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[p \doteq \bar{p}]])]$

$[p \xrightarrow{\text{tex}} \text{“}\backslash\text{mathit}\{p\}\text{”}]$

$[p \xrightarrow{\text{pyk}} \text{“object } p\text{”}]$

*q*

$[q \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[q \doteq \bar{q}]])]$

$[q \xrightarrow{\text{tex}} \text{“}\backslash\text{mathit}\{q\}\text{”}]$

$[q \xrightarrow{\text{pyk}} \text{“object } q\text{”}]$

*r*

$[r \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[r \doteq \bar{r}]])]$

$[r \xrightarrow{\text{tex}} \text{"\mathit{r}"}]$

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

*s*

$[s \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[s \doteq \bar{s}]])]$

$[s \xrightarrow{\text{tex}} \text{"\mathit{s}"}]$

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

*t*

$[t \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[t \doteq \bar{t}]])]$

$[t \xrightarrow{\text{tex}} \text{"\mathit{t}"}]$

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

*u*

$[u \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[u \doteq \bar{u}]])]$

$[u \xrightarrow{\text{tex}} \text{"\mathit{u}"}]$

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

*v*

$[v \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[v \doteq \bar{v}]])]$

$[v \xrightarrow{\text{tex}} \text{"\mathit{v}"}]$

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

*w*

[ $w \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[w \doteq \bar{w}]])$ ]

[ $w \xrightarrow{\text{tex}}$  “  
 $\backslash\text{mathit}\{w\}$ ”]

[ $w \xrightarrow{\text{pyk}}$  “object *w*”]

*x*

[ $x \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[x \doteq \bar{x}]])$ ]

[ $x \xrightarrow{\text{tex}}$  “  
 $\backslash\text{mathit}\{x\}$ ”]

[ $x \xrightarrow{\text{pyk}}$  “object *x*”]

*y*

[ $y \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[y \doteq \bar{y}]])$ ]

[ $y \xrightarrow{\text{tex}}$  “  
 $\backslash\text{mathit}\{y\}$ ”]

[ $y \xrightarrow{\text{pyk}}$  “object *y*”]

*z*

[ $z \xrightarrow{\text{macro}} \lambda t. \lambda s. \lambda c. \tilde{\mathcal{M}}_4(t, s, c, [[z \doteq \bar{z}]])$ ]

[ $z \xrightarrow{\text{tex}}$  “  
 $\backslash\text{mathit}\{z\}$ ”]

[ $z \xrightarrow{\text{pyk}}$  “object *z*”]

$\langle * \equiv * \mid * := * \rangle$

[ $\langle x \equiv y \mid z := u \rangle \xrightarrow{\text{tex}}$  “

$\backslash\text{langle \#1.}$

$\{\backslash\text{equiv}\} \#2.$

$\mid \#3.$

{:=} #4.  
\rangle ”]

[⟨\*≡\* | \*:=\*⟩<sup>pyk</sup> “sub " is " where " is " end sub”]

⟨\*≡<sup>0</sup>\* | \*:=\*⟩

[⟨x≡<sup>0</sup>y|z:=u⟩<sup>tex</sup> “  
\rangle #1.  
\equiv<sup>0</sup> #2.  
| #3.  
{:=} #4.  
\rangle ”]

[⟨\*≡<sup>0</sup>\* | \*:=\*⟩<sup>pyk</sup> “sub zero " is " where " is " end sub”]

⟨\*≡<sup>1</sup>\* | \*:=\*⟩

[⟨x≡<sup>1</sup>y|z:=u⟩<sup>tex</sup> “  
\rangle #1.  
\equiv<sup>1</sup> #2.  
| #3.  
{:=} #4.  
\rangle ”]

[⟨\*≡<sup>1</sup>\* | \*:=\*⟩<sup>pyk</sup> “sub one " is " where " is " end sub”]

⟨\*≡<sup>\*</sup>\* | \*:=\*⟩

[⟨x≡<sup>\*</sup>y|z:=u⟩<sup>tex</sup> “  
\rangle #1.  
\equiv<sup>\*</sup> #2.  
| #3.  
{:=} #4.  
\rangle ”]

[⟨\*≡<sup>\*</sup>\* | \*:=\*⟩<sup>pyk</sup> “sub star " is " where " is " end sub”]

Ded(\*, \*)

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

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

Ded<sub>0</sub>(\*, \*)

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

[Ded<sub>0</sub>(\*, \*)  $\xrightarrow{\text{pyk}}$  “deduction zero " conclude " end deduction”]

Ded<sub>1</sub>(\*, \*, \*)

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

[Ded<sub>1</sub>(\*, \*, \*)  $\xrightarrow{\text{pyk}}$  “deduction one " conclude " condition " end deduction”]

Ded<sub>2</sub>(\*, \*, \*)

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

[Ded<sub>2</sub>(\*, \*, \*)  $\xrightarrow{\text{pyk}}$  “deduction two " conclude " condition " end deduction”]

$\text{Ded}_3(*, *, *, *)$

$[\text{Ded}_3(x, y, z, u) \xrightarrow{\text{tex}} "$   
 $\text{Ded}_3(\#1.$   
 $, \#2.$   
 $, \#3.$   
 $, \#4.$   
 $)]$

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

$\text{Ded}_4(*, *, *, *)$

$[\text{Ded}_4(x, y, z, u) \xrightarrow{\text{tex}} "$   
 $\text{Ded}_4(\#1.$   
 $, \#2.$   
 $, \#3.$   
 $, \#4.$   
 $)]$

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

$\text{Ded}_4^*(*, *, *, *)$

$[\text{Ded}_4^*(x, y, z, u) \xrightarrow{\text{tex}} "$   
 $\text{Ded}_4^*(\#1.$   
 $, \#2.$   
 $, \#3.$   
 $, \#4.$   
 $)]$

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

$\text{Ded}_5(*, *, *, *)$

$[\text{Ded}_5(x, y, z) \xrightarrow{\text{tex}} "$   
 $\text{Ded}_5(\#1.$   
 $, \#2.$

, #3.  
)]

[Ded<sub>5</sub>(\* , \* , \*)  $\xrightarrow{\text{pyk}}$  “deduction five " condition " bound " end deduction”]

Ded<sub>6</sub>(\* , \* , \* , \*)

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

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

Ded<sub>6</sub><sup>\*</sup>(\* , \* , \* , \*)

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

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

Ded<sub>7</sub>(\* )

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

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

Ded<sub>8</sub>(\* , \*)

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

, #2.  
)”]

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

Ded<sub>8</sub><sup>\*</sup>(\* , \*)

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

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

S

[S  $\xrightarrow{\text{stmt}}$   $\Pi \underline{a}: \underline{a} + 0 = \underline{a} \oplus \Pi \underline{a}, \underline{b}: \underline{a} \Rightarrow \underline{b} \vdash \underline{a} \vdash \underline{b} \oplus \Pi \underline{a}, \underline{b},$   
 $\underline{c}: \underline{a} = \underline{b} \vdash \underline{a} = \underline{c} \vdash \underline{b} = \underline{c} \oplus \Pi \underline{a}, \underline{b}: \underline{a} = \underline{b} \vdash \underline{b} = \underline{a} \oplus \Pi \underline{a}: \underline{a} = 0 + \underline{a} \oplus \Pi \underline{x}, \underline{a}, \underline{b},$   
 $\underline{c}: \langle \underline{b} \equiv \underline{a} | \underline{x}: = 0 \rangle \Vdash \langle \underline{c} \equiv \underline{a} | \underline{x}: = \underline{x}' \rangle \Vdash \underline{b} \vdash \underline{a} \Rightarrow \underline{c} \vdash \underline{a} \oplus \Pi \underline{a}: \neg 0 = \underline{a}' \oplus \Pi \underline{a}, \underline{b},$   
 $\underline{c}: \underline{a} = \underline{c} \vdash \underline{b} = \underline{c} \vdash \underline{a} = \underline{b} \oplus \Pi \underline{a}, \underline{b}: \underline{a} + \underline{b} = \underline{b} + \underline{a} \oplus \Pi \underline{a}: \underline{a} \cdot 0 = 0 \oplus \Pi \underline{a},$   
 $\underline{b}: \underline{a}' = \underline{b}' \vdash \underline{a} = \underline{b} \oplus \Pi \underline{a}: \Pi \underline{b}: \neg \underline{b} \Rightarrow \neg \underline{a} \vdash \neg \underline{b} \Rightarrow \underline{a} \vdash \underline{b} \oplus \Pi \underline{a},$   
 $\underline{b}: \underline{a}' + \underline{b} = \underline{a} + \underline{b}' \oplus \Pi \underline{a}, \underline{b}: \text{Ded}(\underline{a}, \underline{b}) \Vdash \underline{a} \vdash \underline{b} \oplus \Pi \underline{a}: \underline{a} = \underline{a} \oplus \Pi \underline{a},$   
 $\underline{b}: \underline{a} \cdot \underline{b}' = \underline{a} \cdot \underline{b} + \underline{a} \oplus \Pi \underline{a}, \underline{b}: \underline{a} = \underline{b} \vdash \underline{a}' = \underline{b}' \oplus \Pi \underline{a}, \underline{b}, \underline{c}: \underline{a} = \underline{b} \vdash \underline{b} = \underline{c} \vdash \underline{a} = \underline{c} \oplus \Pi \underline{x},$   
 $\underline{a}: \underline{a} \vdash \forall \underline{x}: \underline{a} \oplus \Pi \underline{a}, \underline{b}, \underline{c}: \underline{a} = \underline{b} \vdash \underline{a} + \underline{c} = \underline{b} + \underline{c} \oplus \Pi \underline{a}, \underline{b}: \underline{a} + \underline{b}' = \underline{a} + \underline{b}' ]$

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

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

Neg

[Neg  $\xrightarrow{\text{proof}}$  Rule tactic]

[Neg  $\xrightarrow{\text{stmt}}$  S  $\vdash \Pi \underline{a}: \Pi \underline{b}: \neg \underline{b} \Rightarrow \neg \underline{a} \vdash \neg \underline{b} \Rightarrow \underline{a} \vdash \underline{b}$ ]

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

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



# MP

[MP  $\xrightarrow{\text{proof}}$  Rule tactic]

[MP  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}, \underline{b}: \underline{a} \Rightarrow \underline{b} \vdash \underline{a} \vdash \underline{b}$ ]

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

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

# Gen

[Gen  $\xrightarrow{\text{proof}}$  Rule tactic]

[Gen  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{x}, \underline{a}: \underline{a} \vdash \forall \underline{x}: \underline{a}$ ]

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

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

# rule div

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

# Ded

[Ded  $\xrightarrow{\text{proof}}$  Rule tactic]

[Ded  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}, \underline{b}: \text{Ded}(\underline{a}, \underline{b}) \Vdash \underline{a} \vdash \underline{b}$ ]

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

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

# S1

[S1  $\xrightarrow{\text{proof}}$  Rule tactic]

[S1  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}, \underline{b}, \underline{c}: \underline{a} = \underline{b} \vdash \underline{a} = \underline{c} \vdash \underline{b} = \underline{c}$ ]

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

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

## S2

[S2  $\xrightarrow{\text{proof}}$  Rule tactic]

[S2  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}, \underline{b}: \underline{a} = \underline{b} \vdash \underline{a}' = \underline{b}'$ ]

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

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

## S3

[S3  $\xrightarrow{\text{proof}}$  Rule tactic]

[S3  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}: -0 = \underline{a}'$ ]

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

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

## S4

[S4  $\xrightarrow{\text{proof}}$  Rule tactic]

[S4  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}, \underline{b}: \underline{a}' = \underline{b}' \vdash \underline{a} = \underline{b}$ ]

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

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

## S5

[S5  $\xrightarrow{\text{proof}}$  Rule tactic]

[S5  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}: \underline{a} + 0 = \underline{a}$ ]

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

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

## S6

[S6  $\xrightarrow{\text{proof}}$  Rule tactic]

[S6  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}, \underline{b}: \underline{a} + \underline{b}' = \underline{a} + \underline{b}'$ ]

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

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

## S7

[S7  $\xrightarrow{\text{proof}}$  Rule tactic]

[S7  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}: \underline{a} \cdot 0 = 0$ ]

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

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

## S8

[S8  $\xrightarrow{\text{proof}}$  Rule tactic]

[S8  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}, \underline{b}: \underline{a} \cdot \underline{b}' = \underline{a} \cdot \underline{b} + \underline{a}$ ]

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

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

## S9

[S9  $\xrightarrow{\text{proof}}$  Rule tactic]

[S9  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{x}, \underline{a}, \underline{b}, \underline{c}: \langle \underline{b} \equiv \underline{a} \mid \underline{x}: = 0 \rangle \Vdash \langle \underline{c} \equiv \underline{a} \mid \underline{x}: = \underline{x}' \rangle \Vdash \underline{b} \vdash \underline{a} \Rightarrow \underline{c} \vdash \underline{a}$ ]

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

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

S10

[S10  $\xrightarrow{\text{tex}}$  “  
S10”]

[S10  $\xrightarrow{\text{pyk}}$  “axiom s ten”]

Repetition

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

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

A1'

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

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

A2'

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

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

A4'

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

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

A5'

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

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

## Prop 3.2a

[Prop 3.2a  $\xrightarrow{\text{proof}}$  Rule tactic]

[Prop 3.2a  $\xrightarrow{\text{stmt}}$  S  $\vdash$   $\Pi \underline{a}: \underline{a} = \underline{a}$ ]

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

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

## Prop 3.2b

[Prop 3.2b  $\xrightarrow{\text{proof}}$  Rule tactic]

[Prop 3.2b  $\xrightarrow{\text{stmt}}$  S  $\vdash$   $\Pi \underline{a}, \underline{b}: \underline{a} = \underline{b} \vdash \underline{b} = \underline{a}$ ]

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

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

## Prop 3.2c

[Prop 3.2c  $\xrightarrow{\text{proof}}$  Rule tactic]

[Prop 3.2c  $\xrightarrow{\text{stmt}}$  S  $\vdash$   $\Pi \underline{a}, \underline{b}, \underline{c}: \underline{a} = \underline{b} \vdash \underline{b} = \underline{c} \vdash \underline{a} = \underline{c}$ ]

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

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

## Prop 3.2d

[Prop 3.2d  $\xrightarrow{\text{proof}}$  Rule tactic]

[Prop 3.2d  $\xrightarrow{\text{stmt}}$  S  $\vdash$   $\Pi \underline{a}, \underline{b}, \underline{c}: \underline{a} = \underline{c} \vdash \underline{b} = \underline{c} \vdash \underline{a} = \underline{b}$ ]

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

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

## Prop 3.2e<sub>1</sub>

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

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

## Prop 3.2e<sub>2</sub>

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

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

## Prop 3.2e

[Prop 3.2e  $\xrightarrow{\text{proof}}$  Rule tactic]

[Prop 3.2e  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi a, b, c: a = b \vdash a + c = b + c$ ]

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

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

## Prop 3.2f<sub>1</sub>

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

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

## Prop 3.2f<sub>2</sub>

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

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

## Prop 3.2f

[Prop 3.2f  $\xrightarrow{\text{proof}}$  Rule tactic]

[Prop 3.2f  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}: \underline{a} = 0 + \underline{a}$ ]

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

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

## Prop 3.2g<sub>1</sub>

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

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

## Prop 3.2g<sub>2</sub>

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

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

## Prop 3.2g

[Prop 3.2g  $\xrightarrow{\text{proof}}$  Rule tactic]

[Prop 3.2g  $\xrightarrow{\text{stmt}}$   $S \vdash \Pi \underline{a}, \underline{b}: \underline{a}' + \underline{b} = \underline{a} + \underline{b}'$ ]

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

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

## Prop 3.2h<sub>1</sub>

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

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

## Prop 3.2h<sub>2</sub>

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

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

## Prop 3.2h

[Prop 3.2h  $\xrightarrow{\text{proof}}$  Rule tactic]

[Prop 3.2h  $\xrightarrow{\text{stmt}}$  S  $\vdash$   $\Pi \underline{a}, \underline{b}: \underline{a} + \underline{b} = \underline{b} + \underline{a}$ ]

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

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

## Prop 3.2i

[Prop 3.2i  $\xrightarrow{\text{proof}}$   $\lambda \underline{c}. \lambda \underline{x}. \mathcal{P}([\text{S} \vdash$

L<sub>?</sub>: Arbitrary  $\gg$   $\underline{a}, \underline{b}, \underline{c}$  ;  
L<sub>?</sub>: Block  $\gg$  Begin ;  
L<sub>?</sub>: Arbitrary  $\gg$   $\underline{a}, \underline{b}, \underline{c}$   $\underline{a} \mp$  ]

$\underline{b} \vdash \text{Prop 3.2e} \triangleright \underline{a} = \underline{b} \gg \underline{a} + \underline{c} = \underline{b} + \underline{c}; \text{Prop 3.2h} \gg \underline{a} + \underline{c} =$   
 $\underline{c} + \underline{a}; \text{Prop 3.2h} \gg \underline{b} + \underline{c} = \underline{c} + \underline{b}; \text{S1} \triangleright \underline{a} + \underline{c} = \underline{b} + \underline{c} \triangleright \underline{a} + \underline{c} = \underline{c} + \underline{a} \gg \underline{b} + \underline{c} =$   
 $\underline{c} + \underline{a}; \text{Prop 3.2b} \triangleright \underline{b} + \underline{c} = \underline{c} + \underline{a} \gg \underline{c} + \underline{a} = \underline{b} + \underline{c};$

L<sub>g</sub>: Prop 3.2c  $\triangleright \underline{c} + \underline{a} =$   
 $\underline{b} + \underline{c} \triangleright \underline{b} + \underline{c} = \underline{c} + \underline{b} \gg$   $\underline{c} + \underline{a} = \underline{c} + \underline{b}$  ;  
L<sub>g</sub>: Block  $\gg$  End  $\text{Ded} \triangleright$   
L<sub>g</sub>  $\gg \underline{a} = \underline{b} \vdash \underline{c} + \underline{a} = \underline{c} + \underline{b}]$ , p<sub>0</sub>, c)]

[Prop 3.2i  $\xrightarrow{\text{stmt}}$  S  $\vdash$   $\Pi \underline{a}, \underline{b}, \underline{c}: \underline{a} = \underline{b} \vdash \underline{c} + \underline{a} = \underline{c} + \underline{b}$ ]

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

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

## Prop 3.2j<sub>1</sub>

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



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

## Prop 3.2j<sub>2</sub>

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

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

## Prop 3.2j

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

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

## Prop 3.2k<sub>1</sub>

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

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

## Prop 3.2k<sub>2</sub>

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

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

## Prop 3.2k

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

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

## Prop 3.2l<sub>1</sub>

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

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

## Prop 3.2l<sub>2</sub>

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

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

## Prop 3.2l

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

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

## Prop 3.2m<sub>1</sub>

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

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

## Prop 3.2m<sub>2</sub>

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

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

## Prop 3.2m

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

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

## Prop 3.2n<sub>1</sub>

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

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

## Prop 3.2n<sub>2</sub>

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

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

## Prop 3.2n

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

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

## Prop 3.2o

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

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

## Prop 3.4a<sub>1</sub>

[Prop 3.4a<sub>1</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4a\_1”]

[Prop 3.4a<sub>1</sub>  $\xrightarrow{\text{pyk}}$  “prop three four a one”]

## Prop 3.4a<sub>2</sub>

[Prop 3.4a<sub>2</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4a\_2”]

[Prop 3.4a<sub>2</sub>  $\xrightarrow{\text{pyk}}$  “prop three four a two”]

## Prop 3.4a

[Prop 3.4a  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4a”]

[Prop 3.4a  $\xrightarrow{\text{pyk}}$  “prop three four a”]

## Prop 3.4b

[Prop 3.4b  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4b”]

[Prop 3.4b  $\xrightarrow{\text{pyk}}$  “prop three four b”]

## Prop 3.4c<sub>1</sub>

[Prop 3.4c<sub>1</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4c\_1”]

[Prop 3.4c<sub>1</sub>  $\xrightarrow{\text{pyk}}$  “prop three four c one”]

## Prop 3.4c<sub>2</sub>

[Prop 3.4c<sub>2</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4c\_2”]

[Prop 3.4c<sub>2</sub>  $\xrightarrow{\text{pyk}}$  “prop three four c two”]

## Prop 3.4c

[Prop 3.4c  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4c”]

[Prop 3.4c  $\xrightarrow{\text{pyk}}$  “prop three four c”]

## Prop 3.4d<sub>1</sub>

[Prop 3.4d<sub>1</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4d\_1”]

[Prop 3.4d<sub>1</sub>  $\xrightarrow{\text{pyk}}$  “prop three four d one”]

## Prop 3.4d<sub>2</sub>

[Prop 3.4d<sub>2</sub>  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4d\_2”]

[Prop 3.4d<sub>2</sub>  $\xrightarrow{\text{pyk}}$  “prop three four d two”]

## Prop 3.4d

[Prop 3.4d  $\xrightarrow{\text{tex}}$  “  
Prop\ 3.4d”]

[Prop 3.4d  $\xrightarrow{\text{pyk}}$  “prop three four d”]

## Block<sub>1</sub>(\* , \* , \*)

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

[Block<sub>1</sub>(\* , \* , \*)  $\xrightarrow{\text{pyk}}$  “block one " state " cache " end block”]

## Block<sub>2</sub>(\*)

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

[Block<sub>2</sub>(\*)  $\xrightarrow{\text{pyk}}$  “block two " end block”]

\*hide

[x<sup>hide</sup> <sup>tex</sup> → “#1.  
{ }^ {hide}”]

[\*<sup>hide</sup> <sup>pyk</sup> → “” hide”]

MacroIndent(\*)

[MacroIndent(x) <sup>name</sup> → “  
MacroIndent(#1.  
)”]

[MacroIndent(x) <sup>tex</sup> → “  
\$%  
\leftskip=1em%  
\$#1.”]

[MacroIndent(\*) <sup>pyk</sup> → “macro indent ”]

\*'

[x' <sup>tex</sup> → “#1.  
{ }”]

[\*' <sup>pyk</sup> → “” suc”]

\* = \*

[x = y <sup>tex</sup> → “#1.  
= #2.”]

[\* = \* <sup>pyk</sup> → “” equal ”]

\* ≠ \*

[x ≠ y <sup>tex</sup> → “#1.  
\neq #2.”]

[\* ≠ \* <sup>pyk</sup> → “” unequal ”]

\*var

[x<sup>var</sup> <sup>tex</sup> “#1.  
{ } ^ {var}”]

[\*var <sup>pyk</sup> “n is object var”]

\*#<sup>0</sup>\*

[x#<sup>0</sup>y <sup>tex</sup> “#1.  
\#. ^ 0#2.”]

[\*#<sup>0</sup>\* <sup>pyk</sup> “n avoid zero ”]

\*#<sup>1</sup>\*

[x#<sup>1</sup>y <sup>tex</sup> “#1.  
\#. ^ 1#2.”]

[\*#<sup>1</sup>\* <sup>pyk</sup> “n avoid one ”]

\*#<sup>\*</sup>\*

[x#<sup>\*</sup>y <sup>tex</sup> “#1.  
\#. ^ \*#2.”]

[\*#<sup>\*</sup>\* <sup>pyk</sup> “n avoid star ”]

∃\*: \*

[∃x: y <sup>tex</sup> “  
\exists #1.  
\colon #2.”]

[∃\*: \* <sup>pyk</sup> “exist " indeed ”]

∀\*: \*

[∀x: y <sup>tex</sup> “  
\forall #1.

$\backslash\text{colon \#2.}$ ”]

$[\forall *: * \xrightarrow{\text{pyk}} \text{“for all ” indeed ”}]$

$\forall_{\text{obj}} *: *$

$[\forall_{\text{obj}} X: y \xrightarrow{\text{tex}} \text{“}$   
 $\backslash\text{forall}_{\{\text{obj}\}} \#1.$   
 $\backslash\text{colon \#2.}$ ”]

$[\forall_{\text{obj}} *: * \xrightarrow{\text{pyk}} \text{“for all objects ” indeed ”}]$

$* \Rightarrow *$

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

$[* \Rightarrow * \xrightarrow{\text{pyk}} \text{“} \text{” imply ”}]$

$* \Leftrightarrow *$

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

$[* \Leftrightarrow * \xrightarrow{\text{pyk}} \text{“} \text{” if and only if ”}]$

$* \# *$

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

$[* \# * \xrightarrow{\text{pyk}} \text{“} \text{” avoid ”}]$

$* \supseteq *$

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

$[* \supseteq * \xrightarrow{\text{pyk}} \text{“} \text{” object modus ponens ”}]$



$\Pi * : *$

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

```
[ $\Pi * : * \xrightarrow{\text{pyk}}$  “for all terms " indeed """]
```

Begin \*; \* : End; \*

```
[Begin b; l : End; p  $\xrightarrow{\text{name}}$  “  
Begin \, #1.  
; #2.  
: End ; #3.”]
```

```
[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 \csname 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 *; * : End; *  $\xrightarrow{\text{pyk}}$  “block " line " end block """]
```

Last block line \*  $\gg$  \* ;

```
[Last block line a  $\gg$  i ;  $\xrightarrow{\text{name}}$  “  
Last \ block \ line \, #1.  
\gg #2.  
\, ; ”]
```

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

Arbitrary >> \*; \*

```
[Arbitrary >> i; p  $\xrightarrow{\text{name}}$  “
Arbitrary \gg #1.
; #2.”]
[Arbitrary >> i; p  $\xrightarrow{\text{tex}}$  “
\newline \makebox [0.1\textwidth ][l]{$
\if \relax \csname lgwprooflinep\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 >> *; *  $\xrightarrow{\text{pyk}}$  “any term " end line ”]
```

\* | \*

```
[x | y  $\xrightarrow{\text{tex}}$  “#1.
\mathrel{ } #2.”]
[* | *  $\xrightarrow{\text{pyk}}$  “" alternative ”]
```

→

[→<sup>tex</sup> “  
\rightarrow ”]

[→<sup>pyk</sup> “evaluates to”]

\* \ \ \*

[x \ \ y <sup>name</sup> → “#1.  
\backslash \backslash #2.”]

[x \ \ y <sup>tex</sup> → “#1.  
\{\} #2.”]

[\* \ \ \* <sup>pyk</sup> → “" safe row ""]

\* \| \ \*

[x \| y <sup>tex</sup> → “#1.  
\| #2.”]

[\* \| \* <sup>pyk</sup> → “" divides ""]

*The pyk compiler, version 0.grue.20060417+ by Klaus Grue  
GRD-2006-06-21.UTC:11:30:14.300977 = MJD-53907.TAI:11:30:47.300977  
= LGT-4657606247300977e-6*