Logiweb codex of proofreport

Up Help

proofreport, $\dot{0}$, $\dot{1}$, $\dot{2}$, $\dot{a}$, $\dot{b}$, $\dot{c}$, $\dot{d}$, $\dot{e}$, $\dot{f}$, $\dot{g}$, $\dot{h}$, $\dot{i}$, $\dot{j}$, $\dot{k}$, $\dot{l}$, $\dot{m}$, $\dot{n}$, $\dot{o}$, $\dot{p}$, $\dot{q}$, $\dot{r}$, $\dot{s}$, $\dot{t}$, $\dot{u}$, $\dot{v}$, $\dot{w}$, $\dot{x}$, $\dot{y}$, $\dot{z}$, nonfree$(*,*)$, nonfree$^{*}(*,*)$, free$\langle *|* := * \rangle$, free$^{*}\langle *|* := * \rangle$, $*\equiv\langle *|* := * \rangle$, $*\equiv\langle {}^{*}*|* := * \rangle$, S′, A1′, A2′, A3′, A4′, A5′, S1′, S2′, S3′, S4′, S5′, S6′, S7′, S8′, S9′, MP′, Gen′, L3.2(a)′, M3.2(b), M3.2(c), M3.2(d)(I), M3.2(d)(II), M3.2(f), M3.2(g), M3.2(h)(I), M3.2(h)(II), M3.2(h), M3.2(d)$_{\mathrm{h}}$, M1.10(a), M1.10(b), M1.10(b$_{-}$), M1.10(b$_{+}$), MP′$_{\mathrm{h}}$+, Tilføjhypotese$_{+}$, M1.7$_{+}$, M1.7, MP′$_{\mathrm{h}}$, Tilføjhypotese, Gen′$_{\mathrm{h}}$, M3.2(a), M3.2(a)$_{\mathrm{h}}$, M3.2(b)$_{\mathrm{h}}$, M3.1(S1′)$_{\mathrm{h}}$, M3.2(c)$_{\mathrm{h}}$, M3.1(S2′)$_{\mathrm{h}}$, M3.1(S5′)$_{\mathrm{h}}$, M3.1(S6′)$_{\mathrm{h}}$, M3.2(f), $\dot{*}$, $*'$, $*\mathbin{\dot{:}}*$, $*\mathbin{\dot{+}}*$, $*\stackrel{\mathrm{p}}{=}*$, $*^{\mathcal{P}}$, $\dot{\neg}*$, $*\mathbin{\dot{\wedge}}*$, $*\mathbin{\dot{\vee}}*$, $\dot{\forall}*:*$, $\dot{\exists}*:*$, $*\mathbin{\dot{\Rightarrow}}*$, $*\mathbin{\dot{\Leftrightarrow}}*$, $*\mathbin{\dot{\geq}}*$, $*\mathbin{\dot{\geq}}_{\mathrm{h}}*$,

proofreport

[proofreport $\stackrel{\mathrm{prio}}{\rightarrow}$
Preassociative
[proofreport], [base], [bracket $*$ end bracket], [big bracket $*$ end bracket], [math $*$ end math], [**flush left** $[*]$], [x], [y], [z], $[[* \bowtie *]]$, $[[* \stackrel{*}{\rightarrow} *]]$, [pyk], [tex], [name], [prio], $[*]$, [T], [if$(*,*,*)$], $[[* \stackrel{*}{\Rightarrow} *]]$, [val], [claim], [⊥], [f$(*)$], [$(*)^{\mathrm{I}}$], [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], [$(*)^{\mathrm{M}}$], [If$(*,*,*)$], [array$\{*\}$ $*$ end array], [l], [c], [r], [empty], $[\langle * \mid * := * \rangle]$, $[\mathcal{M}(*)]$, $[\mathcal{U}(*)]$, $[\mathcal{U}(*)]$, $[\mathcal{U}^{\mathrm{M}}(*)]$, [**apply**$(*,*)$], [**apply**$_1(*,*)$], [identifier$(*)$], [identifier$_1(*,*)$], [array-plus$(*,*)$], [array-remove$(*,*,*)$], [array-put$(*,*,*,*)$], [array-add$(*,*,*,*,*)$], [bit$(*,*)$], [bit$_1(*,*)$], [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**$(*,*,*,*)$], $[\lceil * \rceil]$, $[\mathcal{M}(*,*,*)]$, $[\mathcal{M}_2(*,*,*,*)]$, $[\mathcal{M}^{*}(*,*,*)]$, [macro], [s_0], [**zip**$(*,*)$], [**assoc**$_1(*,*,*)$], [$(*)^{\mathrm{P}}$], [self], $[[* \doteqdot *]]$, $[[* \doteq *]]$, $[[* \acute{=} *]]$, $[[* \stackrel{\mathrm{pyk}}{=} *]]$, $[[* \stackrel{\mathrm{tex}}{=} *]]$, $[[* \stackrel{\mathrm{name}}{=} *]]$, [**Priority table**$[*]$], $[\tilde{\mathcal{M}}_1]$, $[\tilde{\mathcal{M}}_2(*)]$, $[\tilde{\mathcal{M}}_3(*)]$, $[\tilde{\mathcal{M}}_4(*,*,*,*)]$, $[\tilde{\mathcal{M}}(*,*,*)]$, $[\tilde{\mathcal{Q}}(*,*,*)]$, $[\tilde{\mathcal{Q}}_2(*,*,*)]$, $[\tilde{\mathcal{Q}}_3(*,*,*,*)]$, $[\tilde{\mathcal{Q}}^{*}(*,*,*)]$, $[(*)]$, [**aspect**$(*,*)$], [**aspect**$(*,*,*)$], $[\langle * \rangle]$, [**tuple**$_1(*)$], [**tuple**$_2(*)$], [let$_2(*,*)$], [let$_1(*,*)$], $[[* \stackrel{\mathrm{claim}}{=} *]]$, [checker], [**check**$(*,*)$], [**check**$_2(*,*,*)$], [**check**$_3(*,*,*)$], [**check**$^{*}(*,*)$], [**check**$^{*}_2(*,*,*)$], $[[*]^{\cdot}]$, $[[*]^{-}]$, $[[*]^{\circ}]$, [msg], $[[* \stackrel{\mathrm{msg}}{=} *]]$, [<stmt>], [stmt], $[[* \stackrel{\mathrm{stmt}}{=} *]]$, [HeadNil′], [HeadPair′], [Transitivity′], [⫫], [Contra′], [T'_{E}],

[L_1], [$\underline{*}$], [$\mathcal{A}$], [$\mathcal{B}$], [$\mathcal{C}$], [$\mathcal{D}$], [$\mathcal{E}$], [$\mathcal{F}$], [$\mathcal{G}$], [$\mathcal{H}$], [$\mathcal{I}$], [$\mathcal{J}$], [$\mathcal{K}$], [$\mathcal{L}$], [$\mathcal{M}$], [$\mathcal{N}$], [$\mathcal{O}$], [$\mathcal{P}$], [$\mathcal{Q}$], [$\mathcal{R}$], [$\mathcal{S}$], [$\mathcal{T}$], [$\mathcal{U}$], [$\mathcal{V}$], [$\mathcal{W}$], [$\mathcal{X}$], [$\mathcal{Y}$], [$\mathcal{Z}$], [$\langle * \mid * := * \rangle$], [$\langle {}^{*} * \mid * := * \rangle$], [$\emptyset$], [Remainder], [$(*)^{\mathbf{v}}$], [intro$(*,*,*,*)$], [intro$(*,*,*)$], [error$(*,*)$], [error$_2(*,*)$], [proof$(*,*,*)$], [proof$_2(*,*)$], [$\mathcal{S}(*,*)$], [$\mathcal{S}^{\mathrm{I}}(*,*)$], [$\mathcal{S}^{\triangleright}(*,*)$], [$\mathcal{S}_1^{\triangleright}(*,*,*)$], [$\mathcal{S}^{\mathrm{E}}(*,*)$], [$\mathcal{S}_1^{\mathrm{E}}(*,*,*)$], [$\mathcal{S}^{+}(*,*)$], [$\mathcal{S}_1^{+}(*,*,*)$], [$\mathcal{S}^{-}(*,*)$], [$\mathcal{S}_1^{-}(*,*,*)$], [$\mathcal{S}^{*}(*,*)$], [$\mathcal{S}_1^{*}(*,*,*)$], [$\mathcal{S}_2^{*}(*,*,*,*)$], [$\mathcal{S}^{@}(*,*)$], [$\mathcal{S}_1^{@}(*,*,*)$], [$\mathcal{S}^{\vdash}(*,*)$], [$\mathcal{S}_1^{\vdash}(*,*,*,*)$], [$\mathcal{S}^{\Vdash}(*,*)$], [$\mathcal{S}_1^{\Vdash}(*,*,*,*)$], [$\mathcal{S}^{\mathrm{i.e.}}(*,*)$], [$\mathcal{S}_1^{\mathrm{i.e.}}(*,*,*,*)$], [$\mathcal{S}_2^{\mathrm{i.e.}}(*,*,*,*,*)$], [$\mathcal{S}^{\forall}(*,*)$], [$\mathcal{S}_1^{\forall}(*,*,*,*)$], [$\mathcal{S}^{:}(*,*)$], [$\mathcal{S}_1^{:}(*,*,*)$], [$\mathcal{S}_2^{:}(*,*,*,*)$], [$\mathcal{T}(*)$], [claims$(*,*,*)$], [claims$_2(*,*,*)$], [<proof>], [proof], [[**Lemma** $*$: $*$]], [[**Proof of** $*$: $*$]], [[$*$ **lemma** $*$: $*$]], [[$*$ **antilemma** $*$: $*$]], [[$*$ **rule** $*$: $*$]], [[$*$ **antirule** $*$: $*$]], [verifier], [$\mathcal{V}_1(*)$], [$\mathcal{V}_2(*,*)$], [$\mathcal{V}_3(*,*,*,*)$], [$\mathcal{V}_4(*,*)$], [$\mathcal{V}_5(*,*,*,*)$], [$\mathcal{V}_6(*,*,*,*)$], [$\mathcal{V}_7(*,*,*,*)$], [Cut$(*,*)$], [Head$_{\oplus}(*)$], [Tail$_{\oplus}(*)$], [rule$_1(*,*)$], [rule$(*,*)$], [Rule tactic], [Plus$(*,*)$], [[**Theory** $*$]], [theory$_2(*,*)$], [theory$_3(*,*)$], [theory$_4(*,*,*)$], [HeadNil$''$], [HeadPair$''$], [Transitivity$''$], [Contra$''$], [HeadNil], [HeadPair], [Transitivity], [Contra], [T_{E}], [ragged right], [ragged right expansion], [parm$(*,*,*)$], [parm$^{*}(*,*,*)$], [inst$(*,*)$], [inst$^{*}(*,*)$], [occur$(*,*,*)$], [occur$^{*}(*,*,*)$], [unify$(*=*,*)$], [unify$^{*}(*=*,*)$], [unify$_2(*=*,*)$], [L_{a}], [L_{b}], [L_{c}], [L_{d}], [L_{e}], [L_{f}], [L_{g}], [L_{h}], [L_{i}], [L_{j}], [L_{k}], [L_{l}], [L_{m}], [L_{n}], [L_{o}], [L_{p}], [L_{q}], [L_{r}], [L_{s}], [L_{t}], [L_{u}], [L_{v}], [L_{w}], [L_{x}], [L_{y}], [L_{z}], [L_{A}], [L_{B}], [L_{C}], [L_{D}], [L_{E}], [L_{F}], [L_{G}], [L_{H}], [L_{I}], [L_{J}], [L_{K}], [L_{L}], [L_{M}], [L_{N}], [L_{O}], [L_{P}], [L_{Q}], [L_{R}], [L_{S}], [L_{T}], [L_{U}], [L_{V}], [L_{W}], [L_{X}], [L_{Y}], [L_{Z}], [$\mathrm{L}_{?}$], [Reflexivity], [Reflexivity$_1$], [Commutativity], [Commutativity$_1$], [<tactic>], [tactic], [[$*\ \overset{\text{tactic}}{=}\ *$]], [$\mathcal{P}(*,*,*)$], [$\mathcal{P}^{*}(*,*,*)$], [$\mathrm{p}_0$], [conclude$_1(*,*)$], [conclude$_2(*,*,*)$], [conclude$_3(*,*,*,*)$], [conclude$_4(*,*,*)$], [$\dot{0}$], [$\dot{1}$], [$\dot{2}$], [$\dot{a}$], [$\dot{b}$], [$\dot{c}$], [$\dot{d}$], [$\dot{e}$], [$\dot{f}$], [$\dot{g}$], [$\dot{h}$], [$\dot{i}$], [$\dot{j}$], [$\dot{k}$], [$\dot{l}$], [$\dot{m}$], [$\dot{n}$], [$\dot{o}$], [$\dot{p}$], [$\dot{q}$], [$\dot{r}$], [$\dot{s}$], [$\dot{t}$], [$\dot{u}$], [$\dot{v}$], [$\dot{w}$], [$\dot{x}$], [$\dot{y}$], [$\dot{z}$], [nonfree$(*,*)$], [nonfree$^{*}(*,*)$], [free$\langle * | * := * \rangle$], [free$^{*}\langle * | * := * \rangle$], [$* \equiv \langle * | * := * \rangle$], [$* \equiv \langle {}^{*} * | * := * \rangle$], [S$'$], [A1$'$], [A2$'$], [A3$'$], [A4$'$], [A5$'$], [S1$'$], [S2$'$], [S3$'$], [S4$'$], [S5$'$], [S6$'$], [S7$'$], [S8$'$], [S9$'$], [MP$'$], [Gen$'$], [L3.2(a)$'$], [nani nase kita...:54], [nani nase kita...:55], [nani nase kita...:56], [M3.2(b)], [M3.2(c)], [M3.2(d)(I)], [M3.2(d)(II)], [M3.2(f)], [M3.2(g)], [M3.2(h)(I)], [M3.2(h)(II)], [M3.2(h)], [nani nase kita...:66], [M3.2(d)$_{\mathrm{h}}$], [M1.10(a)], [M1.10(b)], [M1.10(b$_-$)], [M1.10(b$_+$)], [MP$'_{\mathrm{h}}$+], [Tilføjhypotese$_+$], [M1.7$_+$], [M1.7], [MP$'_{\mathrm{h}}$], [Tilføjhypotese], [Gen$'_{\mathrm{h}}$], [M3.2(a)], [M3.2(a)$_{\mathrm{h}}$], [M3.2(b)$_{\mathrm{h}}$], [M3.1(S1$'$)$_{\mathrm{h}}$], [M3.2(c)$_{\mathrm{h}}$], [M3.1(S2$'$)$_{\mathrm{h}}$], [M3.1(S5$'$)$_{\mathrm{h}}$], [M3.1(S6$'$)$_{\mathrm{h}}$], [M3.2(f)];

Preassociative

[$*$_\{$*$\}], [$*'$], [$*[\ *\ ]$], [$*[*\rightarrow *]$], [$*[*\Rightarrow *]$], [$\dot{*}$];

Preassociative

[“ $*$ ”], [], [$(*)^{\mathbf{t}}$], [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],

$[\text{newline } *], [\text{macro newline } *];$
Preassociative
$[*0], [*1], [0\text{b}], [*\text{-color}(*)], [*\text{-color}^*(*)];$
Preassociative
$[* \text{ '} *], [* \text{ `} *];$
Preassociative
$[*^{\text{H}}], [*^{\text{T}}], [*^{\text{U}}], [*^{\text{h}}], [*^{\text{t}}], [*^{\text{s}}], [*^{\text{c}}], [*^{\text{d}}], [*^{\text{a}}], [*^{\text{C}}], [*^{\text{M}}], [*^{\text{B}}], [*^{\text{r}}], [*^{\text{i}}], [*^{\text{d}}], [*^{\text{R}}], [*^{0}],$
$[*^{1}], [*^{2}], [*^{3}], [*^{4}], [*^{5}], [*^{6}], [*^{7}], [*^{8}], [*^{9}], [*^{\text{E}}], [*^{\mathcal{V}}], [*^{\mathcal{C}}], [*^{\mathcal{C}^*}], [*'];$
Preassociative
$[* \cdot *], [* \cdot_0 *], [* \dot{:} *];$
Preassociative
$[* + *], [* +_0 *], [* +_1 *], [* - *], [* -_0 *], [* -_1 *], [* \dot{+} *];$
Preassociative
$[* \cup \{*\}], [* \cup *], [* \backslash \{*\}];$
Postassociative
$[* \therefore *], [* \dot{\therefore} *], [* \underline{::} *], [* \underline{+2*} *], [* :: *], [* +2* *];$
Postassociative
$[*, *];$
Preassociative
$[* \overset{\text{B}}{\approx} *], [* \overset{\text{D}}{\approx} *], [* \overset{\text{C}}{\approx} *], [* \overset{\text{P}}{\approx} *], [* \approx *], [* = *], [* \overset{+}{\to} *], [* \overset{\text{t}}{=} *], [* \overset{\text{t}^*}{=} *], [* \overset{\text{r}}{=} *],$
$[* \in_{\text{t}} *], [* \subseteq_{\text{T}} *], [* \overset{\text{T}}{=} *], [* \overset{\text{s}}{=} *], [* \text{ free in } *], [* \text{ free in}^* *], [* \text{ free for } * \text{ in } *],$
$[* \text{ free for}^* * \text{ in } *], [* \in_{\text{c}} *], [* < *], [* <' *], [* \leq' *], [* \overset{\text{p}}{=} *], [*^{\mathcal{P}}];$
Preassociative
$[\neg *], [\dot{\neg} *];$
Preassociative
$[* \wedge *], [* \ddot{\wedge} *], [* \tilde{\wedge} *], [* \wedge_{\text{c}} *], [* \dot{\wedge} *];$
Preassociative
$[* \vee *], [* \parallel *], [* \ddot{\vee} *], [* \dot{\vee} *];$
Preassociative
$[\dot{\forall} *: *], [\dot{\exists} *: *];$
Postassociative
$[* \ddot{\Rightarrow} *], [* \dot{\Rightarrow} *], [* \dot{\Leftrightarrow} *];$
Postassociative
$[* : *], [*! *];$
Preassociative
$[* \begin{cases} * \\ * \end{cases}];$
Preassociative
$[\lambda * .*], [\Lambda *], [\textbf{if } * \textbf{ then } * \textbf{ else } *], [\textbf{let } * = * \textbf{ in } *], [\textbf{let } * \ddot{=} * \text{ in } *];$
Preassociative
$[*^{\text{I}}], [*^{\triangleright}], [*^{\text{V}}], [*^{+}], [*^{-}], [*^{*}];$
Preassociative
$[* @ *], [* \triangleright *], [* \Rrightarrow *], [* \gg *], [* \trianglerighteq *], [* \trianglerighteq_{\text{h}} *];$
Postassociative
$[* \vdash *], [* \Vdash *], [* \text{i.e. } *];$

Preassociative
$[\forall *: *];$
Postassociative
$[* \oplus *];$
Postassociative
$[*; *];$
Preassociative
$[*$ proves $*];$
Preassociative
$[*$ **proof of** $* : *], [\text{Line} * : * \gg *; *], [\text{Last line} * \gg * \Box],$
$[\text{Line} * : \text{Premise} \gg *; *], [\text{Line} * : \text{Side-condition} \gg *; *], [\text{Arbitrary} \gg *; *],$
$[\text{Local} \gg * = *; *];$
Postassociative
$[*$ then $*], [*[\ *\ ]*];$
Preassociative
$[*\&*];$
Preassociative
$[*\backslash\backslash *];]$

$[\text{proofreport} \overset{\text{pyk}}{\to} \text{“proofreport”}]$

$\dot{0}$

$[\dot{0} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{0\}\text{”}]$

$[\dot{0} \overset{\text{pyk}}{\to} \text{“peano zero”}]$

$\dot{1}$

$[\dot{1} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \ulcorner[\dot{1} \doteqdot \dot{0}']\urcorner)]$

$[\dot{1} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{1\}\text{”}]$

$[\dot{1} \overset{\text{pyk}}{\to} \text{“peano one”}]$

$\dot{2}$

$[\dot{2} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \ulcorner[\dot{2} \doteqdot \dot{1}']\urcorner)]$

$[\dot{2} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{2\}\text{”}]$

$[\dot{2} \overset{\text{pyk}}{\to} \text{“peano two”}]$

$\dot{a}$

$[\dot{a} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{a} \doteq \dot{\mathsf{a}}]\rceil)]$

$[\dot{a} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{a}\}\}\text{”}]$

$[\dot{a} \overset{\text{pyk}}{\to} \text{“peano a”}]$

$\dot{b}$

$[\dot{b} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{b} \doteq \dot{\mathsf{b}}]\rceil)]$

$[\dot{b} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{b}\}\}\text{”}]$

$[\dot{b} \overset{\text{pyk}}{\to} \text{“peano b”}]$

$\dot{c}$

$[\dot{c} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{c} \doteq \dot{\mathsf{c}}]\rceil)]$

$[\dot{c} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{c}\}\}\text{”}]$

$[\dot{c} \overset{\text{pyk}}{\to} \text{“peano c”}]$

$\dot{d}$

$[\dot{d} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{d} \doteq \dot{\mathsf{d}}]\rceil)]$

$[\dot{d} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{d}\}\}\text{”}]$

$[\dot{d} \overset{\text{pyk}}{\to} \text{“peano d”}]$

$\dot{e}$

$[\dot{e} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{e} \doteq \dot{\mathsf{e}}]\rceil)]$

$[\dot{e} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{e}\}\}\text{”}]$

$[\dot{e} \overset{\text{pyk}}{\to} \text{“peano e”}]$

$\dot{f}$

$[\dot{f} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{f} \doteq \dot{\mathsf{f}}]\urcorner)]$

$[\dot{f} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{f}\}\}\text{”}]$

$[\dot{f} \overset{\text{pyk}}{\to} \text{“peano f”}]$

$\dot{g}$

$[\dot{g} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{g} \doteq \dot{\mathsf{g}}]\urcorner)]$

$[\dot{g} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{g}\}\}\text{”}]$

$[\dot{g} \overset{\text{pyk}}{\to} \text{“peano g”}]$

$\dot{h}$

$[\dot{h} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{h} \doteq \dot{\mathsf{h}}]\urcorner)]$

$[\dot{h} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{h}\}\}\text{”}]$

$[\dot{h} \overset{\text{pyk}}{\to} \text{“peano h”}]$

$\dot{i}$

$[\dot{i} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{i} \doteq \dot{\mathsf{i}}]\urcorner)]$

$[\dot{i} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{i}\}\}\text{”}]$

$[\dot{i} \overset{\text{pyk}}{\to} \text{“peano i”}]$

$\dot{j}$

$[\dot{j} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{j} \doteqdot \dot{\mathsf{j}}]\rceil)]$

$[\dot{j} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{j}\}\}\text{”}]$

$[\dot{j} \overset{\text{pyk}}{\to} \text{“peano j”}]$

$\dot{k}$

$[\dot{k} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{k} \doteqdot \dot{\mathsf{k}}]\rceil)]$

$[\dot{k} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{k}\}\}\text{”}]$

$[\dot{k} \overset{\text{pyk}}{\to} \text{“peano k”}]$

$\dot{l}$

$[\dot{l} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{l} \doteqdot \dot{\mathsf{l}}]\rceil)]$

$[\dot{l} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{l}\}\}\text{”}]$

$[\dot{l} \overset{\text{pyk}}{\to} \text{“peano l”}]$

$\dot{m}$

$[\dot{m} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{m} \doteqdot \dot{\mathsf{m}}]\rceil)]$

$[\dot{m} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{m}\}\}\text{”}]$

$[\dot{m} \overset{\text{pyk}}{\to} \text{“peano m”}]$

$\dot{n}$

$[\dot{n} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{n} \doteqdot \dot{\mathsf{n}}]\rceil)]$

$[\dot{n} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{n}\}\}\text{”}]$

$[\dot{n} \overset{\text{pyk}}{\to} \text{“peano n”}]$

$\dot{o}$

$[\dot{o} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{o} \doteqdot \dot{\mathsf{o}}]\rceil)]$

$[\dot{o} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{o}}”]

$[\dot{o} \overset{\text{pyk}}{\rightarrow}$ “peano o”]

$\dot{p}$

$[\dot{p} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{p} \doteqdot \dot{\mathsf{p}}]\rceil)]$

$[\dot{p} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{p}}”]

$[\dot{p} \overset{\text{pyk}}{\rightarrow}$ “peano p”]

$\dot{q}$

$[\dot{q} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{q} \doteqdot \dot{\mathsf{q}}]\rceil)]$

$[\dot{q} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{q}}”]

$[\dot{q} \overset{\text{pyk}}{\rightarrow}$ “peano q”]

$\dot{r}$

$[\dot{r} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{r} \doteqdot \dot{\mathsf{r}}]\rceil)]$

$[\dot{r} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{r}}”]

$[\dot{r} \overset{\text{pyk}}{\rightarrow}$ “peano r”]

$\dot{s}$

$[\dot{s} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{s} \doteqdot \dot{\mathsf{s}}]\rceil)]$

$[\dot{s} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{s}}”]

$[\dot{s} \overset{\text{pyk}}{\rightarrow}$ “peano s”]

$\dot{t}$

$[\dot{t} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{t} \doteqdot \dot{\mathsf{t}}]\rceil)]$

$[\dot{t} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{t}}”]

$[\dot{t} \overset{\text{pyk}}{\rightarrow}$ “peano t”]

$\dot{u}$

$[\dot{u} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{u} \doteqdot \dot{\mathsf{u}}]\rceil)]$

$[\dot{u} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{u}}”]

$[\dot{u} \overset{\text{pyk}}{\rightarrow}$ “peano u”]

$\dot{v}$

$[\dot{v} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{v} \doteqdot \dot{\mathsf{v}}]\rceil)]$

$[\dot{v} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{v}}”]

$[\dot{v} \overset{\text{pyk}}{\rightarrow}$ “peano v”]

$\dot{w}$

$[\dot{w} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{w} \doteqdot \dot{\mathsf{w}}]\rceil)]$

$[\dot{w} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{w}}”]

$[\dot{w} \overset{\text{pyk}}{\rightarrow}$ “peano w”]

$\dot{x}$

$[\dot{x} \overset{\text{macro}}{\rightarrow} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{x} \doteqdot \dot{\mathsf{x}}]\rceil)]$

$[\dot{x} \overset{\text{tex}}{\rightarrow}$ “
\dot{\mathit{x}}”]

$[\dot{x} \overset{\text{pyk}}{\rightarrow}$ “peano x”]

$\dot{y}$

$[\dot{y} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{y} \doteqdot \dot{\mathsf{y}}]\urcorner)]$

$[\dot{y} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{y}\}\}\text{”}]$

$[\dot{y} \overset{\text{pyk}}{\to} \text{“peano y”}]$

$\dot{z}$

$[\dot{z} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{z} \doteqdot \dot{\mathsf{z}}]\urcorner)]$

$[\dot{z} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{z}\}\}\text{”}]$

$[\dot{z} \overset{\text{pyk}}{\to} \text{“peano z”}]$

$\dot{\text{nonfree}}(*,*)$

$[\dot{\text{nonfree}}(\mathsf{x},\mathsf{y}) \overset{\text{val}}{\to}$
$\text{If}(\mathsf{y}^{\mathcal{P}}, \neg\ [\ \mathsf{x} \overset{\text{t}}{=} \mathsf{y}\ ]\ ,$
$\text{If}(\neg\ [\ \mathsf{y} \overset{\text{r}}{=} \ulcorner\dot{\forall}\mathsf{x}\colon \mathsf{y}\urcorner\ ]\ , \dot{\text{nonfree}}^{*}(\mathsf{x},\mathsf{y}^{\text{t}}),$
$\text{If}(\mathsf{x} \overset{\text{t}}{=}\ [\ \mathsf{y}^{1}\ ]\ , \mathsf{T}, \dot{\text{nonfree}}(\mathsf{x},\mathsf{y}^{2}))))]$

$[\dot{\text{nonfree}}(\mathsf{x},\mathsf{y}) \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\text{nonfree}\}(\#1.$
$,\#2.$
$)\text{”}]$

$[\dot{\text{nonfree}}(\mathsf{x},\mathsf{y}) \overset{\text{pyk}}{\to} \text{“peano nonfree } * \text{ in } * \text{ end nonfree”}]$

$\dot{\text{nonfree}}^{*}(*,*)$

$[\dot{\text{nonfree}}^{*}(\mathsf{x},\mathsf{y}) \overset{\text{val}}{\to} \mathsf{x}!\text{If}(\mathsf{y},\mathsf{T},\text{If}(\dot{\text{nonfree}}(\mathsf{x},\mathsf{y}^{\text{h}}),\dot{\text{nonfree}}^{*}(\mathsf{x},\mathsf{y}^{\text{t}}),\mathsf{F}))]$

$[\dot{\text{nonfree}}^{*}(\mathsf{x},\mathsf{y}) \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\text{nonfree}\}\hat{}*(\#1.$
$,\#2.$
$)\text{”}]$

$[\dot{\text{nonfree}}^{*}(\mathsf{x},\mathsf{y}) \overset{\text{pyk}}{\to} \text{“peano nonfree star } * \text{ in } * \text{ end nonfree”}]$

$\dot{\mathsf{free}}\langle *|* := *\rangle$

$[\dot{\mathsf{free}}\langle \mathsf{a}|\mathsf{x} := \mathsf{b}\rangle \overset{\text{val}}{\to} \mathsf{x}!\ [\ \mathsf{b}!$
$\mathrm{If}(\mathsf{a}^{\mathcal{P}}, \mathsf{T},$
$\mathrm{If}(\neg\ [\ \mathsf{a} \overset{\text{r}}{=} \lceil\dot{\forall}\mathsf{u}\colon \mathsf{v}\rceil\ ]\ , \dot{\mathsf{free}}^{*}\langle \mathsf{a}^{\mathsf{t}}|\mathsf{x} := \mathsf{b}\rangle,$
$\mathrm{If}(\mathsf{a}^{1} \overset{\text{t}}{=} \mathsf{x}, \mathsf{T},$
$\mathrm{If}(\dot{\mathrm{nonfree}}(\mathsf{x}, \mathsf{a}^{2}), \mathsf{T},$
$\mathrm{If}(\neg\dot{\mathrm{nonfree}}(\mathsf{a}^{1}, \mathsf{b}), \mathsf{F},$
$\dot{\mathsf{free}}\langle \mathsf{a}^{2}|\mathsf{x} := \mathsf{b}\rangle))))))\ ]\ ]$

$[\dot{\mathsf{free}}\langle \mathsf{a}|\mathsf{x} := \mathsf{b}\rangle \overset{\text{tex}}{\to}$ “
\dot{free}\langle #1.
| #2.
:= #3.
\rangle”]

$[\dot{\mathsf{free}}\langle \mathsf{a}|\mathsf{x} := \mathsf{b}\rangle \overset{\text{pyk}}{\to}$ “peano free ∗ set ∗ to ∗ end free”]

$\dot{\mathsf{free}}^{*}\langle *|* := *\rangle$

$[\dot{\mathsf{free}}^{*}\langle \mathsf{a}|\mathsf{x} := \mathsf{b}\rangle \overset{\text{val}}{\to} \mathsf{x}!\ [\ \mathsf{b}!\mathrm{If}(\mathsf{a}, \mathsf{T}, \mathrm{If}(\dot{\mathsf{free}}\langle \mathsf{a}^{\mathsf{h}}|\mathsf{x} := \mathsf{b}\rangle, \dot{\mathsf{free}}^{*}\langle \mathsf{a}^{\mathsf{t}}|\mathsf{x} := \mathsf{b}\rangle, \mathsf{F}))\ ]\ ]$

$[\dot{\mathsf{free}}^{*}\langle \mathsf{a}|\mathsf{x} := \mathsf{b}\rangle \overset{\text{tex}}{\to}$ “
\dot{free}{}\hat{}*\langle #1.
| #2.
:= #3.
\rangle”]

$[\dot{\mathsf{free}}^{*}\langle \mathsf{a}|\mathsf{x} := \mathsf{b}\rangle \overset{\text{pyk}}{\to}$ “peano free star ∗ set ∗ to ∗ end free”]

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

$[\mathsf{a}\equiv\langle \mathsf{b}|\mathsf{x} := \mathsf{c}\rangle \overset{\text{val}}{\to} \mathsf{a}!\ [\ \mathsf{x}!\ [\ \mathsf{c}!$
$\mathrm{If}(\mathrm{If}(\mathsf{b} \overset{\text{r}}{=} \lceil\dot{\forall}\mathsf{u}\colon \mathsf{v}\rceil, \mathsf{b}^{1} \overset{\text{t}}{=} \mathsf{x}, \mathsf{F}), \mathsf{a} \overset{\text{t}}{=} \mathsf{b},$
$\mathrm{If}(\mathsf{b}^{\mathcal{P}} \wedge\ [\ \mathsf{b} \overset{\text{t}}{=} \mathsf{x}\ ]\ , \mathsf{a} \overset{\text{t}}{=} \mathsf{c}, \mathrm{If}(\ [$
$\mathsf{a}\ ]\ \overset{\text{r}}{=} \mathsf{b}, \mathsf{a}^{\mathsf{t}}\equiv\langle *\mathsf{b}^{\mathsf{t}}|\mathsf{x} := \mathsf{c}\rangle, \mathsf{F})))\ ]\ ]\ ]$

$[\mathsf{a}\equiv\langle \mathsf{b}|\mathsf{x} := \mathsf{c}\rangle \overset{\text{tex}}{\to}$ “#1.
{\equiv}\langle #2.
|#3.
:=#4.
\rangle”]

$[\mathsf{a} \equiv \langle \mathsf{b} | \mathsf{x} := \mathsf{c} \rangle \stackrel{\text{pyk}}{\rightarrow}$ "peano sub * is * where * is * end sub"]

$* \equiv \langle^{*} * | * := * \rangle$

$$[\mathsf{a} \equiv \langle^{*} \mathsf{b} | \mathsf{x} := \mathsf{c} \rangle \stackrel{\text{val}}{\rightarrow} \mathsf{b}!\ [\ \mathsf{x}!\ [\ \mathsf{c}!\mathrm{If}(\mathsf{a}, \mathsf{T}, \mathrm{If}(\mathsf{a}^{\mathrm{h}} \equiv \langle \mathsf{b}^{\mathrm{h}} | \mathsf{x} := \mathsf{c} \rangle, \mathsf{a}^{\mathrm{t}} \equiv \langle^{*} \mathsf{b}^{\mathrm{t}} | \mathsf{x} := \mathsf{c} \rangle, \mathsf{F}))\ ]\ ]\ ]$$

$[\mathsf{a} \equiv \langle^{*} \mathsf{b} | \mathsf{x} := \mathsf{c} \rangle \stackrel{\text{tex}}{\rightarrow}$ "#1.
{\equiv}\langle^* #2.
|#3.
:=#4.
\rangle"]

$[\mathsf{a} \equiv \langle^{*} \mathsf{b} | \mathsf{x} := \mathsf{c} \rangle \stackrel{\text{pyk}}{\rightarrow}$ "peano sub star * is * where * is * end sub"]

S′

$$[\mathrm{S}' \stackrel{\text{stmt}}{\rightarrow} [\ \forall \underline{a}: \forall \underline{b}: [\ [\ \underline{a} \dot{+} [\ \underline{b}'\ ]\ ] \stackrel{p}{=} [\ [\ \underline{a} \dot{+} \underline{b}\ ]'\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: \forall \underline{b}: [\ [\ [\ \dot{\neg} \underline{b}\ ] \dot{\Rightarrow} \dot{\neg} \underline{a}\ ] \dot{\Rightarrow} [\ [\ [\ \dot{\neg} \underline{b}\ ] \dot{\Rightarrow} \underline{a}\ ] \dot{\Rightarrow} \underline{b}\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: \forall \underline{b}: [\ [\ \underline{a} \stackrel{p}{=} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a}' \stackrel{p}{=} [\ \underline{b}'\ ]\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: \forall \underline{b}: [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \vdash [\ \underline{a} \vdash \underline{b}\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: \forall \underline{b}: [\ [\ \underline{a}' \stackrel{p}{=} [\ \underline{b}'\ ]\ ] \dot{\Rightarrow} [\ \underline{a} \stackrel{p}{=} \underline{b}\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: \forall \underline{b}: [\ \underline{a} \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} \underline{a}\ ]\ ]\ ] \oplus [\ [\ \forall \underline{x}: \forall \underline{a}: \forall \underline{b}: [\ \dot{\mathrm{nonfree}}(\lceil \underline{x} \rceil, \lceil \underline{a} \rceil) \Vdash [\ [\ \dot{\forall} \underline{x}: [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ]\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \dot{\forall} \underline{x}: \underline{b}\ ]\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: \forall \underline{b}: [\ [\ \underline{a} \dot{\cdot} [\ \underline{b}'\ ]\ ] \stackrel{p}{=} [\ [\ \underline{a} \dot{\cdot} \underline{b}\ ] \dot{+} \underline{a}\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: [\ [\ \underline{a} \dot{+} \dot{0}\ ] \stackrel{p}{=} \underline{a}\ ]\ ] \oplus [\ [\ \forall \underline{a}: \forall \underline{b}: \forall \underline{c}: [\ [\ \underline{a} \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} \underline{c}\ ]\ ] \dot{\Rightarrow} [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: \forall \underline{b}: \forall \underline{c}: [\ [\ \underline{a} \stackrel{p}{=} \underline{b}\ ] \dot{\Rightarrow} [\ [\ \underline{a} \stackrel{p}{=} \underline{c}\ ] \dot{\Rightarrow} [\ \underline{b} \stackrel{p}{=} \underline{c}\ ]\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: \forall \underline{b}: \forall \underline{c}: \forall \underline{x}: [\ \underline{b} \equiv \langle \underline{a} | \underline{x} := \dot{0} \rangle \Vdash [\ \underline{c} \equiv \langle \underline{a} | \underline{x} := \underline{x}' \rangle \Vdash [\ \underline{b} \dot{\Rightarrow} [\ [\ \dot{\forall} \underline{x}: [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ] \dot{\Rightarrow} \dot{\forall} \underline{x}: \underline{a}\ ]\ ]\ ]\ ]\ ] \oplus [\ [\ \forall \underline{a}: \neg [\ \dot{0} \stackrel{p}{=} [\ \underline{a}'\ ]\ ]\ ] \oplus [\ [\ \forall \underline{x}: \forall \underline{a}: [\ \underline{a} \vdash \dot{\forall} \underline{x}: \underline{a}\ ]\ ] \oplus [\ [\ \forall \underline{c}: \forall \underline{a}: \forall \underline{x}: \forall \underline{b}: [\ \lceil \underline{a} \rceil \equiv \langle \lceil \underline{b} \rceil | \lceil \underline{x} \rceil := \lceil \underline{c} \rceil \rangle \Vdash [\ [\ \dot{\forall} \underline{x}: \underline{b}\ ] \dot{\Rightarrow} \underline{a}\ ]\ ]\ ] \oplus \forall \underline{a}: [\ [\ \underline{a} \dot{\cdot} \dot{0}\ ] \stackrel{p}{=} \dot{0}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]]$$

$[\mathrm{S}' \stackrel{\text{tex}}{\rightarrow}$ "
S'"]

$[\mathrm{S}' \stackrel{\text{pyk}}{\rightarrow}$ "system prime s"]

A1′

$[\mathrm{A1}' \stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

$$[\mathrm{A1}' \stackrel{\text{stmt}}{\rightarrow} \mathrm{S}' \vdash \forall \underline{a}: \forall \underline{b}: [\ \underline{a} \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} \underline{a}\ ]\ ]\ ]$$

$[\mathrm{A1}' \stackrel{\text{tex}}{\rightarrow}$ "
A1'"]

[A1′ $\overset{\text{pyk}}{\longrightarrow}$ “axiom prime a one”]

A2′

[A2′ $\overset{\text{proof}}{\longrightarrow}$ Rule tactic]

[A2′ $\overset{\text{stmt}}{\longrightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \forall \underline{\mathsf{c}}\colon [\ [\ \underline{\mathsf{a}} \dot{\Rightarrow}\ [\ \underline{\mathsf{b}} \dot{\Rightarrow} \underline{\mathsf{c}}\ ]\ ]\ \dot{\Rightarrow}\ [\ [\ \underline{\mathsf{a}} \dot{\Rightarrow} \underline{\mathsf{b}}\ ]\ \dot{\Rightarrow}\ [\ \underline{\mathsf{a}} \dot{\Rightarrow} \underline{\mathsf{c}}\ ]\ ]\ ]$]

[A2′ $\overset{\text{tex}}{\longrightarrow}$ “
A2”’]

[A2′ $\overset{\text{pyk}}{\longrightarrow}$ “axiom prime a two”]

A3′

[A3′ $\overset{\text{proof}}{\longrightarrow}$ Rule tactic]

[A3′ $\overset{\text{stmt}}{\longrightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon [\ [\ [\ \dot{\neg}\, \underline{\mathsf{b}}\ ]\ \dot{\Rightarrow}\ \dot{\neg}\, \underline{\mathsf{a}}\ ]\ \dot{\Rightarrow}\ [\ [\ [\ \dot{\neg}\, \underline{\mathsf{b}}\ ]\ \dot{\Rightarrow}\ \underline{\mathsf{a}}\ ]\ \dot{\Rightarrow}\ \underline{\mathsf{b}}\ ]\ ]$]

[A3′ $\overset{\text{tex}}{\longrightarrow}$ “
A3”’]

[A3′ $\overset{\text{pyk}}{\longrightarrow}$ “axiom prime a three”]

A4′

[A4′ $\overset{\text{proof}}{\longrightarrow}$ Rule tactic]

[A4′ $\overset{\text{stmt}}{\longrightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathsf{c}}\colon \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{x}}\colon \forall \underline{\mathsf{b}}\colon [\ \lceil \underline{\mathsf{a}} \rceil \equiv \langle \lceil \underline{\mathsf{b}} \rceil \,|\, \lceil \underline{\mathsf{x}} \rceil := \lceil \underline{\mathsf{c}} \rceil \rangle \Vdash [\ [\ \dot{\forall} \underline{\mathsf{x}}\colon \underline{\mathsf{b}}\ ]\ \dot{\Rightarrow}\ \underline{\mathsf{a}}\ ]\ ]$]

[A4′ $\overset{\text{tex}}{\longrightarrow}$ “
A4”’]

[A4′ $\overset{\text{pyk}}{\longrightarrow}$ “axiom prime a four”]

A5′

[A5′ $\overset{\text{proof}}{\longrightarrow}$ Rule tactic]

[A5′ $\overset{\text{stmt}}{\longrightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathsf{x}}\colon \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon [\ \dot{\mathrm{nonfree}}(\lceil \underline{\mathsf{x}} \rceil, \lceil \underline{\mathsf{a}} \rceil) \Vdash [\ [\ \dot{\forall} \underline{\mathsf{x}}\colon [\ \underline{\mathsf{a}} \dot{\Rightarrow} \underline{\mathsf{b}}\ ]\ ]\ \dot{\Rightarrow}\ [\ \underline{\mathsf{a}} \dot{\Rightarrow} \dot{\forall} \underline{\mathsf{x}}\colon \underline{\mathsf{b}}\ ]\ ]\ ]$]

[A5′ $\overset{\text{tex}}{\longrightarrow}$ “
A5”’]

[A5′ $\overset{\text{pyk}}{\to}$ “axiom prime a five”]

S1′

[S1′ $\overset{\text{proof}}{\to}$ Rule tactic]

[S1′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon [\ [\ \underline{a} \overset{\text{p}}{=} \underline{b}\ ] \Rightarrow [\ [\ \underline{a} \overset{\text{p}}{=} \underline{c}\ ] \Rightarrow [\ \underline{b} \overset{\text{p}}{=} \underline{c}\ ]\ ]\ ]$]

[S1′ $\overset{\text{tex}}{\to}$ “
S1’”]

[S1′ $\overset{\text{pyk}}{\to}$ “axiom prime s one”]

S2′

[S2′ $\overset{\text{proof}}{\to}$ Rule tactic]

[S2′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon [\ [\ \underline{a} \overset{\text{p}}{=} \underline{b}\ ] \Rightarrow [\ \underline{a}' \overset{\text{p}}{=} [\ \underline{b}'\ ]\ ]\ ]$]

[S2′ $\overset{\text{tex}}{\to}$ “
S2’”]

[S2′ $\overset{\text{pyk}}{\to}$ “axiom prime s two”]

S3′

[S3′ $\overset{\text{proof}}{\to}$ Rule tactic]

[S3′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{a}\colon \neg\ [\ \dot{0} \overset{\text{p}}{=} [\ \underline{a}'\ ]\ ]$]

[S3′ $\overset{\text{tex}}{\to}$ “
S3’”]

[S3′ $\overset{\text{pyk}}{\to}$ “axiom prime s three”]

S4′

[S4′ $\overset{\text{proof}}{\to}$ Rule tactic]

[S4′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon [\ [\ \underline{a}' \overset{\text{p}}{=} [\ \underline{b}'\ ]\ ] \Rightarrow [\ \underline{a} \overset{\text{p}}{=} \underline{b}\ ]\ ]$]

[S4′ $\overset{\text{tex}}{\to}$ “
S4’”]

[S4′ $\overset{\text{pyk}}{\to}$ “axiom prime s four”]

S5′

[S5′ $\overset{\text{proof}}{\to}$ Rule tactic]

[S5′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{a}\colon [\ [\ \underline{a} \dot{+} \dot{0}\ ]\ \overset{\text{p}}{=}\ \underline{a}\ ]$]

[S5′ $\overset{\text{tex}}{\to}$ “
S5’”]

[S5′ $\overset{\text{pyk}}{\to}$ “axiom prime s five”]

S6′

[S6′ $\overset{\text{proof}}{\to}$ Rule tactic]

[S6′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon [\ [\ \underline{a} \dot{+} [\ \underline{b}'\ ]\ ]\ \overset{\text{p}}{=}\ [\ [\ \underline{a} \dot{+} \underline{b}\ ]'\ ]\ ]$]

[S6′ $\overset{\text{tex}}{\to}$ “
S6’”]

[S6′ $\overset{\text{pyk}}{\to}$ “axiom prime s six”]

S7′

[S7′ $\overset{\text{proof}}{\to}$ Rule tactic]

[S7′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{a}\colon [\ [\ \underline{a} \dot{\cdot} \dot{0}\ ]\ \overset{\text{p}}{=}\ \dot{0}\ ]$]

[S7′ $\overset{\text{tex}}{\to}$ “
S7’”]

[S7′ $\overset{\text{pyk}}{\to}$ “axiom prime s seven”]

S8′

[S8′ $\overset{\text{proof}}{\to}$ Rule tactic]

[S8′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon [\ [\ \underline{a} \dot{\cdot} [\ \underline{b}'\ ]\ ]\ \overset{\text{p}}{=}\ [\ [\ \underline{a} \dot{\cdot} \underline{b}\ ]\ \dot{+} \underline{a}\ ]\ ]$]

[S8′ $\overset{\text{tex}}{\to}$ “
S8’”]

[S8′ $\overset{\text{pyk}}{\to}$ “axiom prime s eight”]

S9′

[S9′ $\overset{\text{proof}}{\rightarrow}$ Rule tactic]

[S9′ $\overset{\text{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \forall \underline{\mathsf{c}}\colon \forall \underline{\mathsf{x}}\colon$ [$\underline{\mathsf{b}} \equiv \langle \underline{\mathsf{a}} | \underline{\mathsf{x}} := \dot{0} \rangle \Vdash$ [$\underline{\mathsf{c}} \equiv \langle \underline{\mathsf{a}} | \underline{\mathsf{x}} := \underline{\mathsf{x}}' \rangle \Vdash$ [$\underline{\mathsf{b}} \Rightarrow$ [[$\dot{\forall} \underline{\mathsf{x}}\colon$ [$\underline{\mathsf{a}} \Rightarrow \underline{\mathsf{c}}$]] $\Rightarrow \dot{\forall} \underline{\mathsf{x}}\colon \underline{\mathsf{a}}$]]]]]

[S9′ $\overset{\text{tex}}{\rightarrow}$ “
S9′”]

[S9′ $\overset{\text{pyk}}{\rightarrow}$ “axiom prime s nine”]

MP′

[MP′ $\overset{\text{proof}}{\rightarrow}$ Rule tactic]

[MP′ $\overset{\text{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon$ [[$\underline{\mathsf{a}} \Rightarrow \underline{\mathsf{b}}$] $\vdash$ [$\underline{\mathsf{a}} \vdash \underline{\mathsf{b}}$]]]

[MP′ $\overset{\text{tex}}{\rightarrow}$ “
MP′”]

[MP′ $\overset{\text{pyk}}{\rightarrow}$ “rule prime mp”]

Gen′

[Gen′ $\overset{\text{proof}}{\rightarrow}$ Rule tactic]

[Gen′ $\overset{\text{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathsf{x}}\colon \forall \underline{\mathsf{a}}\colon$ [$\underline{\mathsf{a}} \vdash \dot{\forall} \underline{\mathsf{x}}\colon \underline{\mathsf{a}}$]]

[Gen′ $\overset{\text{tex}}{\rightarrow}$ “
Gen′”]

[Gen′ $\overset{\text{pyk}}{\rightarrow}$ “rule prime gen”]

L3.2(a)′

[L3.2(a)′ $\overset{\text{proof}}{\rightarrow}$ $\lambda \mathsf{c}.\lambda \mathsf{x}.\mathcal{P}(\lceil$[S5′ $\gg$ [[$\underline{\mathsf{a}} \dot{+} \dot{0}$] $\overset{\text{p}}{=} \underline{\mathsf{a}}$]] ; [[S1′ $\gg$ [[[$\underline{\mathsf{a}} \dot{+} \dot{0}$] $\overset{\text{p}}{=} \underline{\mathsf{a}}$] $\Rightarrow$ [[[$\underline{\mathsf{a}} \dot{+} \dot{0}$] $\overset{\text{p}}{=} \underline{\mathsf{a}}$] $\Rightarrow$ [$\underline{\mathsf{a}} \overset{\text{p}}{=} \underline{\mathsf{a}}$]]]] ; [[[[MP′ $\triangleright$ [[[$\underline{\mathsf{a}} \dot{+} \dot{0}$] $\overset{\text{p}}{=} \underline{\mathsf{a}}$] $\Rightarrow$ [[[$\underline{\mathsf{a}} \dot{+} \dot{0}$] $\overset{\text{p}}{=} \underline{\mathsf{a}}$] $\Rightarrow$ [$\underline{\mathsf{a}} \overset{\text{p}}{=} \underline{\mathsf{a}}$]]]] $\triangleright$ [[$\underline{\mathsf{a}} \dot{+} \dot{0}$] $\overset{\text{p}}{=} \underline{\mathsf{a}}$]] $\gg$ [[[$\underline{\mathsf{a}} \dot{+} \dot{0}$] $\overset{\text{p}}{=} \underline{\mathsf{a}}$] $\Rightarrow$ [$\underline{\mathsf{a}} \overset{\text{p}}{=} \underline{\mathsf{a}}$]]] ; [[[MP′ $\triangleright$ [[[$\underline{\mathsf{a}} \dot{+} \dot{0}$] $\overset{\text{p}}{=} \underline{\mathsf{a}}$] $\Rightarrow$ [$\underline{\mathsf{a}} \overset{\text{p}}{=} \underline{\mathsf{a}}$]]] $\triangleright$ [[$\underline{\mathsf{a}} \dot{+} \dot{0}$] $\overset{\text{p}}{=} \underline{\mathsf{a}}$]] $\gg$ [$\underline{\mathsf{a}} \overset{\text{p}}{=} \underline{\mathsf{a}}$]]]] $\rceil, \mathrm{p}_0, \mathsf{c})$]

[L3.2(a)′ $\overset{\text{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathsf{a}}\colon$ [$\underline{\mathsf{a}} \overset{\text{p}}{=} \underline{\mathsf{a}}$]]

[L3.2(a)′ $\overset{\text{tex}}{\rightarrow}$ “L3.2(a)′”]

[L3.2(a)′ $\overset{\text{pyk}}{\to}$ “lemma prime l three two a”]

M3.2(b)

[M3.2(b) $\overset{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{t}\colon \forall \underline{r}\colon [\ [\ S1' \gg [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ] \Rightarrow [\ [\ \underline{t} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ ;\ [\ [\ L3.2(a)' \gg [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]\ ;\ [\ [\ [\ M1.10(b) \rhd [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ] \Rightarrow [\ [\ \underline{t} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ \rhd [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]\ \gg [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ ]\ \rfloor, p_0, c)$]

[M3.2(b) $\overset{\text{stmt}}{\to}$ $S' \vdash \forall \underline{t}\colon \forall \underline{r}\colon [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]$]

[M3.2(b) $\overset{\text{tex}}{\to}$ “M3.2(b)”]

[M3.2(b) $\overset{\text{pyk}}{\to}$ “ lemma prime l three two b”]

M3.2(c)

[M3.2(c) $\overset{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon [\ [\ S1' \gg [\ [\ \underline{r} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ [\ \underline{r} \overset{p}{=} \underline{s}\ ] \Rightarrow [\ \underline{t} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ ]\ ;\ [\ [\ M3.2(b) \gg [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ;\ [\ [\ [\ M1.10(a) \rhd [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ \rhd [\ [\ \underline{r} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ [\ \underline{r} \overset{p}{=} \underline{s}\ ] \Rightarrow [\ \underline{t} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ ]\ \gg [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ] \Rightarrow [\ [\ \underline{r} \overset{p}{=} \underline{s}\ ] \Rightarrow [\ \underline{t} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ ]\ ]\ ]\ \rfloor, p_0, c)$]

[M3.2(c) $\overset{\text{stmt}}{\to}$ $S' \vdash \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ] \Rightarrow [\ [\ \underline{r} \overset{p}{=} \underline{s}\ ] \Rightarrow [\ \underline{t} \overset{p}{=} \underline{s}\ ]\ ]\ ]$]

[M3.2(c) $\overset{\text{tex}}{\to}$ “M3.2(c)”]

[M3.2(c) $\overset{\text{pyk}}{\to}$ “ lemma prime l three two c”]

M3.2(d)(I)

[M3.2(d)(I) $\overset{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon [\ [\ M3.2(c) \gg [\ [\ \underline{r} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ [\ \underline{t} \overset{p}{=} \underline{s}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ M1.10(b_+) \rhd [\ [\ \underline{r} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ [\ \underline{t} \overset{p}{=} \underline{s}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ ]\ \gg [\ [\ \underline{t} \overset{p}{=} \underline{s}\ ] \Rightarrow [\ [\ \underline{r} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ ]\ ;\ [\ [\ M3.2(b) \gg [\ [\ \underline{s} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ \underline{t} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ ;\ [\ [\ [\ M1.10(a) \rhd [\ [\ \underline{s} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ \underline{t} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ \rhd [\ [\ \underline{t} \overset{p}{=} \underline{s}\ ] \Rightarrow [\ [\ \underline{r} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ ]\ \gg [\ [\ \underline{s} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ [\ \underline{r} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{s}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ \rfloor, p_0, c)$]

[M3.2(d)(I) $\overset{\text{stmt}}{\to}$ $S' \vdash \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon [\ [\ \underline{s} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ [\ \underline{r} \overset{p}{=} \underline{t}\ ] \Rightarrow [\ \underline{r} \overset{p}{=} \underline{s}\ ]\ ]\ ]$]

[M3.2(d)(I) $\overset{\text{tex}}{\to}$ “M3.2(d) (I)”]

[M3.2(d)(I) $\overset{\text{pyk}}{\to}$ “ lemma prime l three two d one”]

M3.2(d)(II)

$[\mathrm{M3.2(d)(II)} \overset{\mathrm{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon [\,[\,\mathrm{M3.2(d)(I)} \gg [\,[\,\underline{s} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,;\,[\,[\,\mathrm{M1.10}(\mathrm{b}_{+}) \rhd [\,[\,\underline{s} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,] \gg [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,[\,\underline{s} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,]\,]\,, \mathrm{p}_0, \mathrm{c})]$

$[\mathrm{M3.2(d)(II)} \overset{\mathrm{stmt}}{\rightarrow} \mathrm{S}' \vdash \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,[\,\underline{s} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]]$

$[\mathrm{M3.2(d)(II)} \overset{\mathrm{tex}}{\rightarrow} \text{“M3.2(d) (II)”}]$

$[\mathrm{M3.2(d)(II)} \overset{\mathrm{pyk}}{\rightarrow} \text{“ lemma prime l three two d two”}]$

M3.2(f)

$[\mathrm{M3.2(f)} \overset{\mathrm{tex}}{\rightarrow} \text{“M3.2(f)”}]$

$[\mathrm{M3.2(f)} \overset{\mathrm{pyk}}{\rightarrow} \text{“ lemma prime l three two f”}]$

M3.2(g)

$[\mathrm{M3.2(g)} \overset{\mathrm{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{S}' \vdash [\,[\,\mathrm{S5}' \gg [\,[\,\dot{y}' \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,]\,]\,;\,[\,[\,\mathrm{S5}' \gg [\,[\,\dot{y} \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,\dot{y}\,]\,]\,]\,;\,[\,[\,\mathrm{S2}' \gg [\,[\,[\,\dot{y} \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,\dot{y}\,]\,] \Rightarrow [\,[\,\dot{y} \dot{+} \dot{0}\,]' \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,]\,]\,]\,;\,[\,[\,[\,[\,\mathrm{MP}' \rhd [\,[\,[\,\dot{y} \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,\dot{y}\,]\,] \Rightarrow [\,[\,\dot{y} \dot{+} \dot{0}\,]' \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,]\,]\,] \rhd [\,[\,\dot{y} \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,\dot{y}\,]\,]\,]\,] \gg [\,[\,\dot{y} \dot{+} \dot{0}\,]' \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,]\,]\,;\,[\,[\,\mathrm{M3.2(d)(II)} \gg [\,[\,[\,\dot{y}' \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,] \Rightarrow [\,[\,[\,\dot{y} \dot{+} \dot{0}\,]' \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} \dot{0}\,]'\,]\,]\,]\,]\,;\,[\,[\,[\,[\,\mathrm{MP}' \rhd [\,[\,[\,\dot{y}' \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,] \Rightarrow [\,[\,[\,\dot{y} \dot{+} \dot{0}\,]' \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} \dot{0}\,]'\,]\,]\,]\,] \rhd [\,[\,\dot{y}' \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,]\,] \gg [\,[\,[\,\dot{y} \dot{+} \dot{0}\,]' \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} \dot{0}\,]'\,]\,]\,]\,]\,;\,[\,[\,[\,[\,\mathrm{MP}' \rhd [\,[\,[\,\dot{y} \dot{+} \dot{0}\,]' \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} \dot{0}\,]'\,]\,]\,]\,] \rhd [\,[\,\dot{y} \dot{+} \dot{0}\,]' \overset{\mathrm{p}}{=} [\,\dot{y}'\,]\,]\,] \gg [\,[\,\dot{y}' \dot{+} \dot{0}\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} \dot{0}\,]'\,]\,]\,]\,;\,[\,[\,\mathrm{M1.7} \gg [\,[\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,]\,]\,]\,;\,[\,[\,\mathrm{M3.1(S6')_h} \gg [\,[\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} [\,\dot{x}'\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,]'\,]\,]\,]\,;\,[\,[\,[\,\mathrm{M3.1(S2')_h} \rhd [\,[\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,]\,] \gg [\,[\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,]' \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]''\,]\,]\,]\,]\,;\,[\,[\,[\,[\,\mathrm{M3.2(c)_h} \rhd [\,[\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} [\,\dot{x}'\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,]'\,]\,]\,]\,] \rhd [\,[\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,]' \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]''\,]\,]\,]\,] \gg [\,[\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,] \Rightarrow [\,[\,\dot{y}' \dot{+} [\,\dot{x}'\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]''\,]\,]\,]\,]\,;\,[\,[\,\mathrm{M3.1(S6')_h} \gg [\,[\,[\,\dot{y}' \dot{+} [\,\dot{x}\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,] \Rightarrow [\,[\,\dot{y} \dot{+} [\,\dot{x}'\,]\,] \overset{\mathrm{p}}{=} [\,[\,\dot{y} \dot{+} [\,\dot{x}\,]\,]'\,]\,]\,]\,]\,;\,[\,[\,[$

M3.1(S2′)$_h$ ▷ [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]] ≫ [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ∔ [ẋ′]]′ $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]″]]]] ; [[[[M3.2(d)$_h$ ▷ [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ′ ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]″]]]] ▷ [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ∔ [ẋ′]]′ $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]″]]]] ≫ [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ′ ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ′]]′]]]] ; [[S9′ ≫ [[[ẏ′ ∔0̇] $\stackrel{p}{=}$ [[ẏ∔0̇]′]] ⇒̇ [[∀̇ẋ: [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ′ ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ′]]′]]]]] ⇒̇ ∀̇ẋ: [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]]] ; [[[[MP′ ▷ [[[ẏ′ ∔0̇] $\stackrel{p}{=}$ [[ẏ∔0̇]′]] ⇒̇ [[∀̇ẋ: [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ′ ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ′]]′]]]]] ⇒̇ ∀̇ẋ: [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]]]] ▷ [[ẏ′ ∔0̇] $\stackrel{p}{=}$ [[ẏ∔0̇]′]]] ≫ [[∀̇ẋ: [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ′ ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ′]]′]]]]] ⇒̇ ∀̇ẋ: [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]] ; [[[Gen′ ▷ [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ′ ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ′]]′]]]]] ≫ ∀̇ẋ: [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ′ ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ′]]′]]]] ; [[[[MP′ ▷ [[∀̇ẋ: [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ′ ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ′]]′]]]]] ⇒̇ ∀̇ẋ: [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]]] ▷ ∀̇ẋ: [[[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]] ⇒̇ [[ẏ′ ∔ [ẋ′]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ′]]′]]]]] ≫ ∀̇ẋ: [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]] ; [[[A4′ @ [ẋ]] ≫ [[∀̇ẋ: [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]] ⇒̇ [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]] ; [[[MP′ ▷ [[∀̇ẋ: [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]] ⇒̇ [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]]] ▷ ∀̇ẋ: [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]] ≫ [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′] ⌉, p_0, c)]

[M3.2(g) $\stackrel{\text{stmt}}{\to}$ S′ ⊢ [[ẏ′ ∔ [ẋ]] $\stackrel{p}{=}$ [[ẏ∔ [ẋ]]′]]]

[M3.2(g) $\stackrel{\text{tex}}{\to}$ "M3.2(g)"]

[M3.2(g) $\stackrel{\text{pyk}}{\to}$ " lemma prime l three two g"]

M3.2(h)(I)

[M3.2(h)(I) $\stackrel{\text{proof}}{\to}$ λc.λx.$\mathcal{P}$(⌈S′ ⊢ [[S5′ ≫ [[ẋ∔0̇] $\stackrel{p}{=}$ [ẋ]]]] ; [[M3.2(f) ≫ ∀̇ṫ: [ṫ $\stackrel{p}{=}$ [0̇∔ [ṫ]]]]] ; [[[A4′ @ [ẋ]] ≫ [[∀̇ṫ: [ṫ $\stackrel{p}{=}$ [0̇∔ [ṫ]]]] ⇒̇ [ẋ $\stackrel{p}{=}$ [0̇∔ [ẋ]]]]]] ; [[[[MP′ ▷ [[∀̇ṫ: [ṫ $\stackrel{p}{=}$ [0̇∔ [ṫ]]]] ⇒̇ [ẋ $\stackrel{p}{=}$ [0̇∔ [ẋ]]]]]] ▷ ∀̇ṫ: [ṫ $\stackrel{p}{=}$ [0̇∔ [ṫ]]]]] ≫ [ẋ $\stackrel{p}{=}$ [0̇∔ [ẋ]]]]] ; [[M3.2(c) ≫ [[[ẋ∔0̇] $\stackrel{p}{=}$ [ẋ]] ⇒̇ [[ẋ $\stackrel{p}{=}$ [0̇∔ [ẋ]]] ⇒̇ [[ẋ∔0̇] $\stackrel{p}{=}$ [0̇∔ [ẋ]]]]]]] ; [[[[MP′ ▷ [[[ẋ∔0̇] $\stackrel{p}{=}$ [ẋ]] ⇒̇ [[ẋ $\stackrel{p}{=}$ [0̇∔ [ẋ]]] ⇒̇ [[ẋ∔0̇] $\stackrel{p}{=}$ [0̇∔ [ẋ]]]]]]] ▷ [[ẋ∔0̇

] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{x}}$]]] $\gg$ [[$\dot{\mathrm{x}}$ $\stackrel{\mathrm{p}}{=}$ [$\dot{0}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}\dot{0}$] $\stackrel{\mathrm{p}}{=}$ [$\dot{0}\dot{+}$ [$\dot{\mathrm{x}}$]]]]] ; [[[MP′ $\triangleright$ [[$\dot{\mathrm{x}}$ $\stackrel{\mathrm{p}}{=}$ [$\dot{0}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}\dot{0}$] $\stackrel{\mathrm{p}}{=}$ [$\dot{0}\dot{+}$ [$\dot{\mathrm{x}}$]]]]] $\triangleright$ [$\dot{\mathrm{x}}$ $\stackrel{\mathrm{p}}{=}$ [$\dot{0}\dot{+}$ [$\dot{\mathrm{x}}$]]]] $\gg$ [[$\dot{\mathrm{x}}\dot{+}\dot{0}$] $\stackrel{\mathrm{p}}{=}$ [$\dot{0}\dot{+}$ [$\dot{\mathrm{x}}$]]]]]]]]]] ⌉, p_0, c)]

[M3.2(h)(I) $\stackrel{\mathrm{stmt}}{\rightarrow}$ S′ $\vdash$ [[$\dot{\mathrm{x}}\dot{+}\dot{0}$] $\stackrel{\mathrm{p}}{=}$ [$\dot{0}\dot{+}$ [$\dot{\mathrm{x}}$]]]]

[M3.2(h)(I) $\stackrel{\mathrm{tex}}{\rightarrow}$ “M3.2(h) (I)”]

[M3.2(h)(I) $\stackrel{\mathrm{pyk}}{\rightarrow}$ “ lemma prime l three two h one”]

M3.2(h)(II)

[M3.2(h)(II) $\stackrel{\mathrm{proof}}{\rightarrow}$ λc.λx.$\mathcal{P}$(⌈S′ $\vdash$ [[M1.7 $\gg$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]]]] ; [[$\mathrm{M3.1(S6')_h}$ $\gg$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}'$]] $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]]′]]]] ; [[M3.2(g) $\gg$ [[$\dot{\mathrm{y}}'\dot{+}$ [$\dot{\mathrm{x}}$]] $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]′]]] ; [[[Tilføjhypotese $\triangleright$ [[$\dot{\mathrm{y}}'\dot{+}$ [$\dot{\mathrm{x}}$]] $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]′]]] $\gg$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{y}}'\dot{+}$ [$\dot{\mathrm{x}}$]] $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]′]]]] ; [[[$\mathrm{M3.1(S2')_h}$ $\triangleright$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]]]] $\gg$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]]′ $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]′]]]] ; [[[[$\mathrm{M3.2(c)_h}$ $\triangleright$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}'$]] $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]]′]]]] $\triangleright$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]]′ $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]′]]]] $\gg$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}'$]] $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]′]]]] ; [[[$\mathrm{M3.2(d)_h}$ $\triangleright$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}'$]] $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]′]]]] $\triangleright$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{y}}'\dot{+}$ [$\dot{\mathrm{x}}$]] $\stackrel{\mathrm{p}}{=}$ [[$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]′]]] $\gg$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}'$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}'\dot{+}$ [$\dot{\mathrm{x}}$]]]]]]]]]]]] ⌉, p_0, c)]

[M3.2(h)(II) $\stackrel{\mathrm{stmt}}{\rightarrow}$ S′ $\vdash$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}'$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}'\dot{+}$ [$\dot{\mathrm{x}}$]]]]]

[M3.2(h)(II) $\stackrel{\mathrm{tex}}{\rightarrow}$ “M3.2(h) (II)”]

[M3.2(h)(II) $\stackrel{\mathrm{pyk}}{\rightarrow}$ “ lemma prime l three two h two”]

M3.2(h)

[M3.2(h) $\stackrel{\mathrm{proof}}{\rightarrow}$ λc.λx.$\mathcal{P}$(⌈S′ $\vdash$ [[S9′ $\gg$ [[[$\dot{\mathrm{x}}\dot{+}\dot{0}$] $\stackrel{\mathrm{p}}{=}$ [$\dot{0}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\forall}\dot{\mathrm{y}}$: [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}'$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}'\dot{+}$ [$\dot{\mathrm{x}}$]]]]] $\Rightarrow$ $\dot{\forall}\dot{\mathrm{y}}$: [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]]]]] ; [[M3.2(h)(I) $\gg$ [[$\dot{\mathrm{x}}\dot{+}\dot{0}$] $\stackrel{\mathrm{p}}{=}$ [$\dot{0}\dot{+}$ [$\dot{\mathrm{x}}$]]]] ; [[M3.2(h)(II) $\gg$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$ [$\dot{\mathrm{x}}$]]] $\Rightarrow$ [[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}'$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}'\dot{+}$ [$\dot{\mathrm{x}}$]]]]] ; [[[Gen′ $\triangleright$ [[[$\dot{\mathrm{x}}\dot{+}$ [$\dot{\mathrm{y}}$]] $\stackrel{\mathrm{p}}{=}$ [$\dot{\mathrm{y}}\dot{+}$

$[\,[\,\dot{x}\,]\,]\,]\Rightarrow[\,[\,\dot{x}\dot{+}[\,\dot{y}'\,]\,]\stackrel{p}{=}[\,\dot{y}'\dot{+}[\,\dot{x}\,]\,]\,]\,]\gg\dot{\forall}\dot{y}\colon[\,[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\Rightarrow[\,[\,\dot{x}\dot{+}[\,\dot{y}'\,]\,]\stackrel{p}{=}[\,\dot{y}'\dot{+}[\,\dot{x}\,]\,]\,]\,]\,];[\,[\,[\,[\,\mathrm{MP}'\rhd[\,[\,[\,\dot{x}\dot{+}\dot{0}\,]\stackrel{p}{=}[\,\dot{0}\dot{+}[\,\dot{x}\,]\,]\,]\Rightarrow[\,[\,\dot{\forall}\dot{y}\colon[\,[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\Rightarrow[\,[\,\dot{x}\dot{+}[\,\dot{y}'\,]\,]\stackrel{p}{=}[\,\dot{y}'\dot{+}[\,\dot{x}\,]\,]\,]\,]\Rightarrow\dot{\forall}\dot{y}\colon[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\,]\,]\rhd[\,[\,\dot{x}\dot{+}\dot{0}\,]\stackrel{p}{=}[\,\dot{0}\dot{+}[\,\dot{x}\,]\,]\,]\,]\gg[\,[\,\dot{\forall}\dot{y}\colon[\,[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\Rightarrow[\,[\,\dot{x}\dot{+}[\,\dot{y}'\,]\,]\stackrel{p}{=}[\,\dot{y}'\dot{+}[\,\dot{x}\,]\,]\,]\,]\,]\Rightarrow\dot{\forall}\dot{y}\colon[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\,]\,]\,];[\,[\,[\,[\,\mathrm{MP}'\rhd[\,[\,\dot{\forall}\dot{y}\colon[\,[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\Rightarrow[\,[\,\dot{x}\dot{+}[\,\dot{y}'\,]\,]\stackrel{p}{=}[\,\dot{y}'\dot{+}[\,\dot{x}\,]\,]\,]\,]\,]\Rightarrow\dot{\forall}\dot{y}\colon[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\,]\,]\rhd\dot{\forall}\dot{y}\colon[\,[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\Rightarrow[\,[\,\dot{x}\dot{+}[\,\dot{y}'\,]\,]\stackrel{p}{=}[\,\dot{y}'\dot{+}[\,\dot{x}\,]\,]\,]\,]\,]\gg\dot{\forall}\dot{y}\colon[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\,]\,];[\,[\,\mathrm{Gen}'\rhd\dot{\forall}\dot{y}\colon[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\,]\,]\gg\dot{\forall}\dot{x}\colon\dot{\forall}\dot{y}\colon[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]\,]\,]\,]\,]\,]\,]\,],\mathrm{p}_0,\mathsf{c})]$

$[\mathrm{M3.2(h)}\stackrel{\mathrm{stmt}}{\rightarrow}\mathrm{S}'\vdash\dot{\forall}\dot{x}\colon\dot{\forall}\dot{y}\colon[\,[\,\dot{x}\dot{+}[\,\dot{y}\,]\,]\stackrel{p}{=}[\,\dot{y}\dot{+}[\,\dot{x}\,]\,]\,]]$

$[\mathrm{M3.2(h)}\stackrel{\mathrm{tex}}{\rightarrow}\text{“M3.2(h)”}]$

$[\mathrm{M3.2(h)}\stackrel{\mathrm{pyk}}{\rightarrow}\text{“ lemma prime l three two h”}]$

$\mathrm{M3.2(d)_h}$

$[\mathrm{M3.2(d)_h}\stackrel{\mathrm{proof}}{\rightarrow}\lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil\mathrm{S}'\vdash\forall\underline{\mathsf{h}}\colon\forall\underline{\mathsf{t}}\colon\forall\underline{\mathsf{r}}\colon\forall\underline{\mathsf{s}}\colon[\,[\,\underline{\mathsf{h}}\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\,]\vdash[\,[\,\underline{\mathsf{h}}\Rightarrow[\,\underline{\mathsf{s}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\,]\vdash[\,[\,\mathrm{M3.2(d)(I)}\gg[\,[\,\underline{\mathsf{s}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{s}}\,]\,]\,]\,];[\,[\,[\,\mathrm{Tilføjhypotese}\rhd[\,[\,\underline{\mathsf{s}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{s}}\,]\,]\,]\,]\gg[\,\underline{\mathsf{h}}\Rightarrow[\,[\,\underline{\mathsf{s}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{s}}\,]\,]\,]\,];[\,[\,[\,[\,\mathrm{MP}'_{\mathrm{h}}\rhd[\,\underline{\mathsf{h}}\Rightarrow[\,[\,\underline{\mathsf{s}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{s}}\,]\,]\,]\,]\rhd[\,\underline{\mathsf{h}}\Rightarrow[\,\underline{\mathsf{s}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\,]\,]\gg[\,\underline{\mathsf{h}}\Rightarrow[\,[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{s}}\,]\,]\,]\,];[\,[\,[\,\mathrm{MP}'_{\mathrm{h}}\rhd[\,\underline{\mathsf{h}}\Rightarrow[\,[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{s}}\,]\,]\,]\,]\rhd[\,\underline{\mathsf{h}}\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\,]\,]\gg[\,\underline{\mathsf{h}}\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{s}}\,]\,]\,]\,]\,]\,]\,]\rceil,\mathrm{p}_0,\mathsf{c})]$

$[\mathrm{M3.2(d)_h}\stackrel{\mathrm{stmt}}{\rightarrow}\mathrm{S}'\vdash\forall\underline{\mathsf{h}}\colon\forall\underline{\mathsf{t}}\colon\forall\underline{\mathsf{r}}\colon\forall\underline{\mathsf{s}}\colon[\,[\,\underline{\mathsf{h}}\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\,]\vdash[\,[\,\underline{\mathsf{h}}\Rightarrow[\,\underline{\mathsf{s}}\stackrel{p}{=}\underline{\mathsf{t}}\,]\,]\vdash[\,\underline{\mathsf{h}}\Rightarrow[\,\underline{\mathsf{r}}\stackrel{p}{=}\underline{\mathsf{s}}\,]\,]\,]\,]]$

$[\mathrm{M3.2(d)_h}\stackrel{\mathrm{tex}}{\rightarrow}\text{“M3.2(d)\_h”}]$

$[\mathrm{M3.2(d)_h}\stackrel{\mathrm{pyk}}{\rightarrow}\text{“ hypothetical three two d”}]$

M1.10(a)

$[\mathrm{M1.10(a)}\stackrel{\mathrm{proof}}{\rightarrow}\lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil\mathrm{S}'\vdash\forall\underline{\mathsf{a}}\colon\forall\underline{\mathsf{b}}\colon\forall\underline{\mathsf{c}}\colon[\,[\,\underline{\mathsf{a}}\Rightarrow\underline{\mathsf{b}}\,]\vdash[\,[\,\underline{\mathsf{b}}\Rightarrow\underline{\mathsf{c}}\,]\vdash[\,[\,\mathrm{M1.7}\gg[\,\underline{\mathsf{a}}\Rightarrow\underline{\mathsf{a}}\,]\,];[\,[\,[\,\mathrm{Tilføjhypotese}\rhd[\,\underline{\mathsf{a}}\Rightarrow\underline{\mathsf{b}}\,]\,]\gg[\,\underline{\mathsf{a}}\Rightarrow[\,\underline{\mathsf{a}}\Rightarrow\underline{\mathsf{b}}\,]\,]\,];[\,[\,[\,\mathrm{Tilføjhypotese}\rhd[\,\underline{\mathsf{b}}\Rightarrow\underline{\mathsf{c}}\,]\,]\gg[\,\underline{\mathsf{a}}\Rightarrow[\,\underline{\mathsf{b}}\Rightarrow\underline{\mathsf{c}}\,]\,]\,];[\,[\,[\,[\,\mathrm{MP}'_{\mathrm{h}}\rhd[\,\underline{\mathsf{a}}\Rightarrow[\,\underline{\mathsf{a}}\Rightarrow\underline{\mathsf{b}}\,]\,]\,]\rhd[\,\underline{\mathsf{a}}\Rightarrow\underline{\mathsf{a}}\,]\,]\gg[\,\underline{\mathsf{a}}\Rightarrow\underline{\mathsf{b}}\,]\,];[\,[\,[\,\mathrm{MP}'_{\mathrm{h}}\rhd[\,\underline{\mathsf{a}}\Rightarrow[$

$\underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \rhd [\ \underline{a} \Rightarrow \underline{b} \ ] \ ] \gg [\ \underline{a} \Rightarrow \underline{c} \ ] \ ] \ ] \ ] \ ] \ ] \ ] \rceil, p_0, c)]$

$[\text{M1.10(a)} \overset{\text{stmt}}{\rightarrow} S' \vdash \forall \underline{a} \colon \forall \underline{b} \colon \forall \underline{c} \colon [\ [\ \underline{a} \Rightarrow \underline{b} \ ] \vdash [\ [\ \underline{b} \Rightarrow \underline{c} \ ] \vdash [\ \underline{a} \Rightarrow \underline{c} \ ] \ ] \ ]$

$[\text{M1.10(a)} \overset{\text{tex}}{\rightarrow} \text{“M1.10(a)”}]$

$[\text{M1.10(a)} \overset{\text{pyk}}{\rightarrow} \text{“ mendelson corollary one ten a ”}]$

M1.10(b)

$[\text{M1.10(b)} \overset{\text{proof}}{\rightarrow} \lambda c. \lambda x. \mathcal{P}(\lceil S' \vdash \forall \underline{a} \colon \forall \underline{b} \colon \forall \underline{c} \colon [\ [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \vdash [\ \underline{b} \vdash [\ [\ [\ \text{Tilføjhypotese} \rhd [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \gg [\ \underline{a} \Rightarrow [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \ ] ; [\ [\ [\ \text{Tilføjhypotese} \rhd [\ \underline{b} \ ] \gg [\ \underline{a} \Rightarrow \underline{b} \ ] \ ] ; [\ [\ \text{M1.7} \gg [\ \underline{a} \Rightarrow \underline{a} \ ] \ ] ; [\ [\ [\ [\ \text{MP}'_{\text{h}} \rhd [\ \underline{a} \Rightarrow [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \ ] \rhd [\ \underline{a} \Rightarrow \underline{a} \ ] \ ] \gg [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] ; [\ [\ [\ \text{MP}'_{\text{h}} \rhd [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \rhd [\ \underline{a} \Rightarrow \underline{b} \ ] \ ] \gg [\ \underline{a} \Rightarrow \underline{c} \ ] \ ] \ ] \ ] \ ] \ ] \ ] \rceil, p_0, c)]$

$[\text{M1.10(b)} \overset{\text{stmt}}{\rightarrow} S' \vdash \forall \underline{a} \colon \forall \underline{b} \colon \forall \underline{c} \colon [\ [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \vdash [\ \underline{b} \vdash [\ \underline{a} \Rightarrow \underline{c} \ ] \ ] \ ]$

$[\text{M1.10(b)} \overset{\text{tex}}{\rightarrow} \text{“}$
$\text{M1.10(b)”}]$

$[\text{M1.10(b)} \overset{\text{pyk}}{\rightarrow} \text{“mendelson corollary one ten b”}]$

M1.10(b_-)

$[\text{M1.10(b}_-\text{)} \overset{\text{proof}}{\rightarrow} \lambda c. \lambda x. \mathcal{P}(\lceil S' \vdash \forall \underline{a} \colon \forall \underline{b} \colon \forall \underline{c} \colon [\ [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \vdash [\ \underline{b} \vdash [\ \underline{a} \vdash [\ [\ [\ [\ \text{MP}' \rhd [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \rhd \underline{a} \ ] \gg [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] ; [\ [\ [\ \text{MP}' \rhd [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \rhd \underline{b} \ ] \gg \underline{c} \ ] \ ] \ ] \ ] \rceil, p_0, c)]$

$[\text{M1.10(b}_-\text{)} \overset{\text{stmt}}{\rightarrow} S' \vdash \forall \underline{a} \colon \forall \underline{b} \colon \forall \underline{c} \colon [\ [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \vdash [\ \underline{b} \vdash [\ \underline{a} \vdash \underline{c} \ ] \ ] \ ]$

$[\text{M1.10(b}_-\text{)} \overset{\text{tex}}{\rightarrow} \text{“}$
$\text{M1.10(b}_-\text{)”}]$

$[\text{M1.10(b}_-\text{)} \overset{\text{pyk}}{\rightarrow} \text{“mendelson corollary one ten pre b”}]$

M1.10(b_+)

$[\text{M1.10(b}_+\text{)} \overset{\text{proof}}{\rightarrow} \lambda c. \lambda x. \mathcal{P}(\lceil S' \vdash \forall \underline{a} \colon \forall \underline{b} \colon \forall \underline{c} \colon [\ [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \vdash [\ [\ \text{M1.7}_+ \gg [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{b} \ ] \ ] \ ] ; [\ [\ \text{M1.7} \gg [\ \underline{a} \Rightarrow \underline{a} \ ] \ ] ; [\ [\ [\ \text{Tilføjhypotese} \rhd [\ \underline{a} \Rightarrow \underline{a} \ ] \ ] \gg [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{a} \ ] \ ] \ ] ; [\ [\ [\ \text{Tilføjhypotese}_+ \rhd [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \gg [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \ ] \ ] ; [\ [\ [\ [\ \text{MP}'_{\text{h}} + \rhd [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \ ] \ ] \rhd [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{a} \ ] \ ] \ ] \gg [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] ; [\ [\ [\ \text{MP}'_{\text{h}} + \rhd [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow [\ \underline{b} \Rightarrow \underline{c} \ ] \ ] \ ] \rhd [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{b} \ ] \ ] \ ] \gg [\ \underline{b} \Rightarrow [$

$\underline{a} \dot{\Rightarrow} \underline{c}$]]]]]]]]] $\rceil, p_0, c)]$

[M1.10(b_+) $\overset{\text{stmt}}{\rightarrow}$ $S' \vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon$ [[$\underline{a} \dot{\Rightarrow}$ [$\underline{b} \dot{\Rightarrow} \underline{c}$]] $\vdash$ [$\underline{b} \dot{\Rightarrow}$ [$\underline{a} \dot{\Rightarrow} \underline{c}$]]]]

[M1.10(b_+) $\overset{\text{tex}}{\rightarrow}$ "
M1.10(b_+)"]

[M1.10(b_+) $\overset{\text{pyk}}{\rightarrow}$ "mendelson corollary one ten b plus plus"]

MP'_h+

[MP'_h+ $\overset{\text{proof}}{\rightarrow}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{i}\colon \forall \underline{h}\colon \forall \underline{a}\colon \forall \underline{b}\colon$ [[$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{a} \dot{\Rightarrow} \underline{b}$]]] $\vdash$ [[$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{a}$]] $\vdash$ [[$A2' \gg$ [[$\underline{h} \dot{\Rightarrow}$ [$\underline{a} \dot{\Rightarrow} \underline{b}$]] $\dot{\Rightarrow}$ [[$\underline{h} \dot{\Rightarrow} \underline{a}$] $\dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{b}$]]]] ; [[[Tilføjhypotese $\rhd$ [[$\underline{h} \dot{\Rightarrow}$ [$\underline{a} \dot{\Rightarrow} \underline{b}$]] $\dot{\Rightarrow}$ [[$\underline{h} \dot{\Rightarrow} \underline{a}$] $\dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{b}$]]]] $\gg$ [$\underline{i} \dot{\Rightarrow}$ [[$\underline{h} \dot{\Rightarrow}$ [$\underline{a} \dot{\Rightarrow} \underline{b}$]] $\dot{\Rightarrow}$ [[$\underline{h} \dot{\Rightarrow} \underline{a}$] $\dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{b}$]]]]] ; [[[[$MP'_h \rhd$ [$\underline{i} \dot{\Rightarrow}$ [[$\underline{h} \dot{\Rightarrow}$ [$\underline{a} \dot{\Rightarrow} \underline{b}$]] $\dot{\Rightarrow}$ [[$\underline{h} \dot{\Rightarrow} \underline{a}$] $\dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{b}$]]]]]] $\rhd$ [$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{a} \dot{\Rightarrow} \underline{b}$]]]] $\gg$ [$\underline{i} \dot{\Rightarrow}$ [[$\underline{h} \dot{\Rightarrow} \underline{a}$] $\dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{b}$]]]] ; [[[$MP'_h \rhd$ [$\underline{i} \dot{\Rightarrow}$ [[$\underline{h} \dot{\Rightarrow} \underline{a}$] $\dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{b}$]]]]] $\rhd$ [$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{a}$]]] $\gg$ [$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{b}$]]]]]]]]] $\rceil, p_0, c)]$

[MP'_h+ $\overset{\text{stmt}}{\rightarrow}$ $S' \vdash \forall \underline{i}\colon \forall \underline{h}\colon \forall \underline{a}\colon \forall \underline{b}\colon$ [[$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{a} \dot{\Rightarrow} \underline{b}$]]] $\vdash$ [[$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{a}$]] $\vdash$ [$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{b}$]]]]]]

[MP'_h+ $\overset{\text{tex}}{\rightarrow}$ "
MP'_h+"]

[MP'_h+ $\overset{\text{pyk}}{\rightarrow}$ "hypothetical rule prime mp plus plus"]

Tilføjhypotese$_+$

[Tilføjhypotese$_+$ $\overset{\text{proof}}{\rightarrow}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{i}\colon \forall \underline{h}\colon \forall \underline{a}\colon$ [$\underline{a} \vdash$ [[[Tilføjhypotese $\rhd \underline{a}$] $\gg$ [$\underline{h} \dot{\Rightarrow} \underline{a}$]] ; [[Tilføjhypotese $\rhd$ [$\underline{h} \dot{\Rightarrow} \underline{a}$]] $\gg$ [$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{a}$]]]]] $\rceil, p_0, c)]$

[Tilføjhypotese$_+$ $\overset{\text{stmt}}{\rightarrow}$ $S' \vdash \forall \underline{i}\colon \forall \underline{h}\colon \forall \underline{a}\colon$ [$\underline{a} \vdash$ [$\underline{i} \dot{\Rightarrow}$ [$\underline{h} \dot{\Rightarrow} \underline{a}$]]]]

[Tilføjhypotese$_+$ $\overset{\text{tex}}{\rightarrow}$ "
Tilf\o j hypotese_+"]

[Tilføjhypotese$_+$ $\overset{\text{pyk}}{\rightarrow}$ "hypothesize plus plus"]

$\mathrm{M1.7}_{+}$

$[\mathrm{M1.7}_{+} \overset{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{a}\colon \forall \underline{b}\colon [\ [\ \mathrm{M1.7} \gg [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ;\ [\ [\ \mathrm{A1}' \gg [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{Tilføjhypotese} \rhd [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ]\ ]\ ] \gg [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{MP}'_{\mathrm{h}} \rhd [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ]\ ]\ ] \rhd [\ \underline{b} \Rightarrow \underline{b}\ ]\ ] \gg [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ ]\ ]\ \rfloor, \mathrm{p}_0, \mathsf{c})]$

$[\mathrm{M1.7}_{+} \overset{\text{stmt}}{\rightarrow} \mathrm{S}' \vdash \forall \underline{a}\colon \forall \underline{b}\colon [\ \underline{b} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ]\ ]$

$[\mathrm{M1.7}_{+} \overset{\text{tex}}{\rightarrow}$ “
M1.7_+”]

$[\mathrm{M1.7}_{+} \overset{\text{pyk}}{\rightarrow}$ “mendelson one seven plus plus”]

M1.7

$[\mathrm{M1.7} \overset{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{b}\colon [\ [\ \mathrm{A1}' \gg [\ \underline{b} \Rightarrow [\ [\ \underline{b} \Rightarrow \underline{b}\ ] \Rightarrow \underline{b}\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{A2}' \gg [\ [\ \underline{b} \Rightarrow [\ [\ \underline{b} \Rightarrow \underline{b}\ ] \Rightarrow \underline{b}\ ]\ ] \Rightarrow [\ [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ] \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ \mathrm{MP}' \rhd [\ [\ \underline{b} \Rightarrow [\ [\ \underline{b} \Rightarrow \underline{b}\ ] \Rightarrow \underline{b}\ ]\ ] \Rightarrow [\ [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ] \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ] \rhd [\ \underline{b} \Rightarrow [\ [\ \underline{b} \Rightarrow \underline{b}\ ] \Rightarrow \underline{b}\ ]\ ]\ ] \gg [\ [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ] \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{A1}' \gg [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{MP}' \rhd [\ [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ] \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ] \rhd [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ] \gg [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ ]\ ]\ \rfloor, \mathrm{p}_0, \mathsf{c})]$

$[\mathrm{M1.7} \overset{\text{stmt}}{\rightarrow} \mathrm{S}' \vdash \forall \underline{b}\colon [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]$

$[\mathrm{M1.7} \overset{\text{tex}}{\rightarrow}$ “
M1.7”]

$[\mathrm{M1.7} \overset{\text{pyk}}{\rightarrow}$ “mendelson one seven”]

$\mathrm{MP}'_{\mathrm{h}}$

$[\mathrm{MP}'_{\mathrm{h}} \overset{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{a}\colon \forall \underline{b}\colon [\ [\ \underline{h} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ] \vdash [\ [\ \underline{h} \Rightarrow \underline{a}\ ] \vdash [\ [\ \mathrm{A2}' \gg [\ [\ \underline{h} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ] \Rightarrow [\ [\ \underline{h} \Rightarrow \underline{a}\ ] \Rightarrow [\ \underline{h} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{MP}' \rhd [\ [\ \underline{h} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ] \Rightarrow [\ [\ \underline{h} \Rightarrow \underline{a}\ ] \Rightarrow [\ \underline{h} \Rightarrow \underline{b}\ ]\ ]\ ]\ ] \rhd [\ \underline{h} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ]\ ] \gg [\ [\ \underline{h} \Rightarrow \underline{a}\ ] \Rightarrow [\ \underline{h} \Rightarrow \underline{b}\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{MP}' \rhd [\ [\ \underline{h} \Rightarrow \underline{a}\ ] \Rightarrow [\ \underline{h} \Rightarrow \underline{b}\ ]\ ]\ ] \rhd [\ \underline{h} \Rightarrow \underline{a}\ ]\ ] \gg [\ \underline{h} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ ]\ \rfloor, \mathrm{p}_0, \mathsf{c})]$

$[\mathrm{MP}'_{\mathrm{h}} \overset{\text{stmt}}{\rightarrow} \mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{a}\colon \forall \underline{b}\colon [\ [\ \underline{h} \Rightarrow [\ \underline{a} \Rightarrow \underline{b}\ ]\ ] \vdash [\ [\ \underline{h} \Rightarrow \underline{a}\ ] \vdash [\ \underline{h} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]$

$[\mathrm{MP}'_{\mathrm{h}} \overset{\text{tex}}{\rightarrow}$ “
MP’_h”]

$[\mathrm{MP}'_{\mathrm{h}} \overset{\text{pyk}}{\rightarrow}$ “hypothetical rule prime mp”]

Tilføjhypotese

$[\text{Tilføjhypotese} \overset{\text{proof}}{\to} \lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{\mathsf{h}}\colon \forall \underline{\mathsf{a}}\colon [\, \underline{\mathsf{a}} \vdash [\, [\, \mathrm{A1}' \gg [\, \underline{\mathsf{a}} \Rightarrow [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,]\,]\,]\,]\,; [\, [\, [\, \mathrm{MP}' \rhd [\, \underline{\mathsf{a}} \Rightarrow [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,]\,]\,]\,] \rhd \underline{\mathsf{a}} \,] \gg [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,]\,]\,]\,] \rfloor, \mathrm{p}_0, \mathsf{c})]$

$[\text{Tilføjhypotese} \overset{\text{stmt}}{\to} \mathrm{S}' \vdash \forall \underline{\mathsf{h}}\colon \forall \underline{\mathsf{a}}\colon [\, \underline{\mathsf{a}} \vdash [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,]\,]\,]$

$[\text{Tilføjhypotese} \overset{\text{tex}}{\to}$ “
Tilf\o j hypotese”$]$

$[\text{Tilføjhypotese} \overset{\text{pyk}}{\to}$ “hypothesize”$]$

$\mathrm{Gen}'_{\mathrm{h}}$

$[\mathrm{Gen}'_{\mathrm{h}} \overset{\text{proof}}{\to} \lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{\mathsf{h}}\colon \forall \underline{\mathsf{x}}\colon \forall \underline{\mathsf{a}}\colon [\, \dot{\mathrm{nonfree}}(\lceil \underline{\mathsf{x}} \rceil, \lceil \underline{\mathsf{h}} \rceil) \Vdash [\, [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,] \vdash [\, [\, [\, \mathrm{A5}' \Rrightarrow \dot{\mathrm{nonfree}}(\lceil \underline{\mathsf{x}} \rceil, \lceil \underline{\mathsf{h}} \rceil) \,] \gg [\, [\, \dot{\forall} \underline{\mathsf{x}}\colon [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,]\,] \Rightarrow [\, \underline{\mathsf{h}} \Rightarrow \dot{\forall} \underline{\mathsf{x}}\colon \underline{\mathsf{a}} \,]\,]\,]\,; [\, [\, [\, \mathrm{Gen}' \rhd [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,]\,] \gg \dot{\forall} \underline{\mathsf{x}}\colon [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,]\,]\,; [\, [\, [\, \mathrm{MP}' \rhd [\, [\, \dot{\forall} \underline{\mathsf{x}}\colon [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,]\,] \Rightarrow [\, \underline{\mathsf{h}} \Rightarrow \dot{\forall} \underline{\mathsf{x}}\colon \underline{\mathsf{a}} \,]\,]\,] \rhd \dot{\forall} \underline{\mathsf{x}}\colon [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,]\,] \gg [\, \underline{\mathsf{h}} \Rightarrow \dot{\forall} \underline{\mathsf{x}}\colon \underline{\mathsf{a}} \,]\,]\,]\,]\,]\,]\,]\,] \rfloor, \mathrm{p}_0, \mathsf{c})]$

$[\mathrm{Gen}'_{\mathrm{h}} \overset{\text{stmt}}{\to} \mathrm{S}' \vdash \forall \underline{\mathsf{h}}\colon \forall \underline{\mathsf{x}}\colon \forall \underline{\mathsf{a}}\colon [\, \dot{\mathrm{nonfree}}(\lceil \underline{\mathsf{x}} \rceil, \lceil \underline{\mathsf{h}} \rceil) \Vdash [\, [\, \underline{\mathsf{h}} \Rightarrow \underline{\mathsf{a}} \,] \vdash [\, \underline{\mathsf{h}} \Rightarrow \dot{\forall} \underline{\mathsf{x}}\colon \underline{\mathsf{a}} \,]\,]\,]$

$[\mathrm{Gen}'_{\mathrm{h}} \overset{\text{tex}}{\to}$ “
Gen’_h”$]$

$[\mathrm{Gen}'_{\mathrm{h}} \overset{\text{pyk}}{\to}$ “hypothetical rule prime gen”$]$

M3.2(a)

$[\text{M3.2(a)} \overset{\text{tex}}{\to}$ “
M3.2(a)”$]$

$[\text{M3.2(a)} \overset{\text{pyk}}{\to}$ “mendelson three two a”$]$

$\text{M3.2(a)}_{\mathrm{h}}$

$[\text{M3.2(a)}_{\mathrm{h}} \overset{\text{proof}}{\to} \lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{\mathsf{h}}\colon \forall \underline{\mathsf{t}}\colon [\, [\, \mathrm{L3.2(a)}' \gg [\, \underline{\mathsf{t}} \overset{\mathrm{p}}{=} \underline{\mathsf{t}} \,]\,]\,; [\, [\, \text{Tilføjhypotese} \rhd [\, \underline{\mathsf{t}} \overset{\mathrm{p}}{=} \underline{\mathsf{t}} \,]\,] \gg [\, \underline{\mathsf{h}} \Rightarrow [\, \underline{\mathsf{t}} \overset{\mathrm{p}}{=} \underline{\mathsf{t}} \,]\,]\,]\,]\,] \rfloor, \mathrm{p}_0, \mathsf{c})]$

$[\text{M3.2(a)}_{\mathrm{h}} \overset{\text{stmt}}{\to} \mathrm{S}' \vdash \forall \underline{\mathsf{h}}\colon \forall \underline{\mathsf{t}}\colon [\, \underline{\mathsf{h}} \Rightarrow [\, \underline{\mathsf{t}} \overset{\mathrm{p}}{=} \underline{\mathsf{t}} \,]\,]\,]$

$[\text{M3.2(a)}_{\mathrm{h}} \overset{\text{tex}}{\to}$ “
M3.2(a)_h”$]$

$[\mathrm{M3.2(a)_h} \overset{\mathrm{pyk}}{\rightarrow} \text{“hypothetical three two a”}]$

$\mathrm{M3.2(b)_h}$

$[\mathrm{M3.2(b)_h} \overset{\mathrm{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon [\,[\,\underline{h} \Rightarrow [\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,]\,] \vdash [\,[\,\mathrm{S1}' \gg [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,] \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,]\,]\,]\,]\,]\,; [\,[\,[\,\mathrm{Tilføjhypotese} \rhd [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,] \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,]\,]\,]\,]\,]\,; [\,[\,[\,[\,\mathrm{MP}'_{\mathrm{h}} \rhd [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,] \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,]\,]\,]\,]\,]\,] \rhd [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,]\,]\,]\,] \gg [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,]\,]\,]\,]\,]\,; [\,[\,[\,[\,\mathrm{MP}'_{\mathrm{h}} \rhd [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{t}\,] \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,]\,]\,]\,]\,] \rhd [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{t}\,]\,]\,]\,] \gg [\,\underline{h} \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,], \mathrm{p}_0, \mathsf{c})]$

$[\mathrm{M3.2(b)_h} \overset{\mathrm{stmt}}{\rightarrow} \mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon [\,[\,\underline{h} \Rightarrow [\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,]\,] \vdash [\,\underline{h} \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{t}\,]\,]\,]]$

$[\mathrm{M3.2(b)_h} \overset{\mathrm{tex}}{\rightarrow} \text{“}$
M3.2(b)_h”]

$[\mathrm{M3.2(b)_h} \overset{\mathrm{pyk}}{\rightarrow} \text{“hypothetical three two b”}]$

$\mathrm{M3.1(S1')_h}$

$[\mathrm{M3.1(S1')_h} \overset{\mathrm{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon [\,[\,\underline{h} \Rightarrow [\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,]\,] \vdash [\,[\,\underline{h} \Rightarrow [\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,]\,] \vdash [\,[\,\mathrm{S1}' \gg [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,] \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,]\,]\,; [\,[\,[\,\mathrm{Tilføjhypotese} \rhd [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,] \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,] \gg [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,] \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,]\,; [\,[\,[\,[\,\mathrm{MP}'_{\mathrm{h}} \rhd [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,] \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,]\,] \rhd [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,]\,]\,]\,] \gg [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,]\,; [\,[\,[\,[\,\mathrm{MP}'_{\mathrm{h}} \rhd [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,] \rhd [\,\underline{h} \Rightarrow [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,] \gg [\,\underline{h} \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,], \mathrm{p}_0, \mathsf{c})]$

$[\mathrm{M3.1(S1')_h} \overset{\mathrm{stmt}}{\rightarrow} \mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon [\,[\,\underline{h} \Rightarrow [\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,]\,] \vdash [\,[\,\underline{h} \Rightarrow [\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,]\,] \vdash [\,\underline{h} \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]]$

$[\mathrm{M3.1(S1')_h} \overset{\mathrm{tex}}{\rightarrow} \text{“}$
M3.1(S1')_h”]

$[\mathrm{M3.1(S1')_h} \overset{\mathrm{pyk}}{\rightarrow} \text{“hypothetical three one s one”}]$

$\mathrm{M3.2(c)_h}$

$[\mathrm{M3.2(c)_h} \overset{\mathrm{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon [\,[\,\underline{h} \Rightarrow [\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,]\,] \vdash [\,[\,\underline{h} \Rightarrow [\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,]\,] \vdash [\,[\,\mathrm{M3.2(c)} \gg [\,[\,\underline{t} \overset{\mathrm{p}}{=} \underline{r}\,] \Rightarrow [\,[\,\underline{r} \overset{\mathrm{p}}{=} \underline{s}\,] \Rightarrow [\,\underline{t} \overset{\mathrm{p}}{=} \underline{s}\,]\,]\,]\,]\,]\,; [\,[\,[$

Tilføjhypotese $\triangleright$ [[$\underline{t} \overset{p}{=} \underline{r}$] $\dot{\Rightarrow}$ [[$\underline{r} \overset{p}{=} \underline{s}$] $\dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{s}$]]]] $\gg$ [$\underline{h} \dot{\Rightarrow}$ [[$\underline{t} \overset{p}{=} \underline{r}$] $\dot{\Rightarrow}$ [[$\underline{r} \overset{p}{=} \underline{s}$] $\dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{s}$]]]] ; [[[[$\mathrm{MP}'_{\mathrm{h}}$ $\triangleright$ [$\underline{h} \dot{\Rightarrow}$ [[$\underline{t} \overset{p}{=} \underline{r}$] $\dot{\Rightarrow}$ [[$\underline{r} \overset{p}{=} \underline{s}$] $\dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{s}$]]]] $\triangleright$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{r}$]]] $\gg$ [$\underline{h} \dot{\Rightarrow}$ [[$\underline{r} \overset{p}{=} \underline{s}$] $\dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{s}$]]]] ; [[[$\mathrm{MP}'_{\mathrm{h}}$ $\triangleright$ [$\underline{h} \dot{\Rightarrow}$ [[$\underline{r} \overset{p}{=} \underline{s}$] $\dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{s}$]]]] $\triangleright$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{r} \overset{p}{=} \underline{s}$]]] $\gg$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{s}$]]]]]]] ⌉, p_0, c)]

[$\mathrm{M3.2(c)_h} \overset{\mathrm{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon \forall \underline{s}\colon$ [[$\underline{h} \dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{r}$]] $\vdash$ [[$\underline{h} \dot{\Rightarrow}$ [$\underline{r} \overset{p}{=} \underline{s}$]] $\vdash$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{s}$]]]]]

[$\mathrm{M3.2(c)_h} \overset{\mathrm{tex}}{\rightarrow}$ “
M3.2(c)_h”]

[$\mathrm{M3.2(c)_h} \overset{\mathrm{pyk}}{\rightarrow}$ “hypothetical three two c”]

$\mathrm{M3.1(S2')_h}$

[$\mathrm{M3.1(S2')_h} \overset{\mathrm{proof}}{\rightarrow}$ $\lambda \mathrm{c}.\lambda \mathrm{x}.\mathcal{P}$(⌈$\mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon$ [[$\underline{h} \dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{r}$]] $\vdash$ [[S2' $\gg$ [[$\underline{t} \overset{p}{=} \underline{r}$] $\dot{\Rightarrow}$ [$\underline{t}' \overset{p}{=}$ [$\underline{r}'$]]]]] ; [[[Tilføjhypotese $\triangleright$ [[$\underline{t} \overset{p}{=} \underline{r}$] $\dot{\Rightarrow}$ [$\underline{t}' \overset{p}{=}$ [$\underline{r}'$]]]]] $\gg$ [$\underline{h} \dot{\Rightarrow}$ [[$\underline{t} \overset{p}{=} \underline{r}$] $\dot{\Rightarrow}$ [$\underline{t}' \overset{p}{=}$ [$\underline{r}'$]]]]] ; [[[$\mathrm{MP}'_{\mathrm{h}}$ $\triangleright$ [$\underline{h} \dot{\Rightarrow}$ [[$\underline{t} \overset{p}{=} \underline{r}$] $\dot{\Rightarrow}$ [$\underline{t}' \overset{p}{=}$ [$\underline{r}'$]]]]] $\triangleright$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{r}$]]] $\gg$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{t}' \overset{p}{=}$ [$\underline{r}'$]]]]]] ⌉, p_0, c)]

[$\mathrm{M3.1(S2')_h} \overset{\mathrm{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon$ [[$\underline{h} \dot{\Rightarrow}$ [$\underline{t} \overset{p}{=} \underline{r}$]] $\vdash$ [$\underline{h} \dot{\Rightarrow}$ [$\underline{t}' \overset{p}{=}$ [$\underline{r}'$]]]]]

[$\mathrm{M3.1(S2')_h} \overset{\mathrm{tex}}{\rightarrow}$ “
M3.1(S2')_h”]

[$\mathrm{M3.1(S2')_h} \overset{\mathrm{pyk}}{\rightarrow}$ “hypothetical three one s two”]

$\mathrm{M3.1(S5')_h}$

[$\mathrm{M3.1(S5')_h} \overset{\mathrm{proof}}{\rightarrow}$ $\lambda \mathrm{c}.\lambda \mathrm{x}.\mathcal{P}$(⌈$\mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon$ [[S5' $\gg$ [[$\underline{t} \dot{+} \dot{0}$] $\overset{p}{=} \underline{t}$]] ; [[Tilføjhypotese $\triangleright$ [[$\underline{t} \dot{+} \dot{0}$] $\overset{p}{=} \underline{t}$]] $\gg$ [$\underline{h} \dot{\Rightarrow}$ [[$\underline{t} \dot{+} \dot{0}$] $\overset{p}{=} \underline{t}$]]]] ⌉, p_0, c)]

[$\mathrm{M3.1(S5')_h} \overset{\mathrm{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \forall \underline{h}\colon \forall \underline{t}\colon$ [$\underline{h} \dot{\Rightarrow}$ [[$\underline{t} \dot{+} \dot{0}$] $\overset{p}{=} \underline{t}$]]]

[$\mathrm{M3.1(S5')_h} \overset{\mathrm{tex}}{\rightarrow}$ “
M3.1(S5')_h”]

[$\mathrm{M3.1(S5')_h} \overset{\mathrm{pyk}}{\rightarrow}$ “hypothetical three one s five”]

M3.1(S6′)$_{\mathrm{h}}$

$[\mathrm{M3.1(S6')_h} \stackrel{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon [\ [\ S6' \gg [\ [\ \underline{t} \dot{+} [\ \underline{r}'\ ]\ ] \stackrel{p}{=} [\ [\ \underline{t} \dot{+} \underline{r}$
$]\ '\ ]\ ]\ ]\ ;\ [\ [\ \text{Tilføjhypotese} \rhd [\ [\ \underline{t} \dot{+} [\ \underline{r}'\ ]\ ] \stackrel{p}{=} [\ [\ \underline{t} \dot{+} \underline{r}\ ]\ '\ ]\ ]\ ]\ \gg [\ \underline{h} \Rightarrow [$
$[\ \underline{t} \dot{+} [\ \underline{r}'\ ]\ ] \stackrel{p}{=} [\ [\ \underline{t} \dot{+} \underline{r}\ ]\ '\ ]\ ]\ ]\ ]\ ]\ ]\rceil, p_0, c)]$

$[\mathrm{M3.1(S6')_h} \stackrel{\text{stmt}}{\rightarrow} S' \vdash \forall \underline{h}\colon \forall \underline{t}\colon \forall \underline{r}\colon [\ \underline{h} \Rightarrow [\ [\ \underline{t} \dot{+} [\ \underline{r}'\ ]\ ] \stackrel{p}{=} [\ [\ \underline{t} \dot{+} \underline{r}\ ]\ '\ ]\ ]\ ]\ ]$

$[\mathrm{M3.1(S6')_h} \stackrel{\text{tex}}{\rightarrow}$ “
M3.1(S6’)_h”]

$[\mathrm{M3.1(S6')_h} \stackrel{\text{pyk}}{\rightarrow}$ “hypothetical three one s six”]

M3.2(f)

$[\mathrm{M3.2(f)} \stackrel{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash [\ [\ A1' \gg [\ x \dot{\Rightarrow} [\ x \Rightarrow x\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{M3.1(S5')_h} \gg$
$[\ [\ x \dot{\Rightarrow} [\ x \Rightarrow x\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{0} \dot{+} \dot{0}\ ] \stackrel{p}{=} \dot{0}\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{M3.2(b)_h} \rhd [\ [\ x \dot{\Rightarrow} [$
$x \Rightarrow x\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{0} \dot{+} \dot{0}\ ] \stackrel{p}{=} \dot{0}\ ]\ ]\ ] \gg [\ [\ x \dot{\Rightarrow} [\ x \Rightarrow x\ ]\ ] \dot{\Rightarrow} [\ \dot{0} \stackrel{p}{=} [\ \dot{0} \dot{+} \dot{0}\ ]$
$]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ x \dot{\Rightarrow} [\ x \Rightarrow x\ ]\ ] \dot{\Rightarrow} [\ \dot{0} \stackrel{p}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ]\ ]\ \rhd [\ x \dot{\Rightarrow} [$
$x \Rightarrow x\ ]\ ]\ ] \gg [\ \dot{0} \stackrel{p}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ]\ ;\ [\ [\ M1.7 \gg [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [$
$\dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{M3.1(S2')_h} \rhd [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t} \stackrel{p}{=} [$
$\dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ]\ ]\ ]\ ] \gg [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=} [\ [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ;$
$[\ [\ \mathrm{M3.1(S6')_h} \gg [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{0} \dot{+} [\ \dot{t}'\ ]\ ] \stackrel{p}{=} [\ [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ '$
$]\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{M3.2(b)_h} \rhd [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{0} \dot{+} [\ \dot{t}'\ ]\ ] \stackrel{p}{=} [\ [$
$\dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ '\ ]\ ]\ ]\ ]\ \gg [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ' \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}'\ ]$
$]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ \mathrm{M3.2(c)_h} \rhd [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=} [\ [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ '\ ]$
$]\ ]\ ]\ \rhd [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ' \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}'\ ]\ ]\ ]\ ]\ ]\ ]\ \gg [$
$[\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}'\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ Gen' \rhd [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+}$
$[\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}'\ ]\ ]\ ]\ ]\ ]\ \gg \dot{\forall} t\colon [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=}$
$[\ \dot{0} \dot{+} [\ \dot{t}'\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ S9' \gg [\ [\ \dot{0} \stackrel{p}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{\forall} t\colon [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}$
$]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}'\ ]\ ]\ ]\ ]\ ]\ \dot{\Rightarrow} \dot{\forall} t\colon [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [$
$MP' \rhd [\ [\ \dot{0} \stackrel{p}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{\forall} t\colon [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=} [\ \dot{0} \dot{+} [$
$\dot{t}'\ ]\ ]\ ]\ ]\ ]\ \dot{\Rightarrow} \dot{\forall} t\colon [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ \rhd [\ \dot{0} \stackrel{p}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ]\ \gg [\ [\ \dot{\forall} t\colon$
$[\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}'\ ]\ ]\ ]\ ]\ ]\ \dot{\Rightarrow} \dot{\forall} t\colon [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ]$
$]\ ]\ ;\ [\ [\ [\ MP' \rhd [\ [\ \dot{\forall} t\colon [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}'\ ]\ ]\ ]\ ]\ ]$
$\dot{\Rightarrow} \dot{\forall} t\colon [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ]\ ]\ ]\ ]\ \rhd \dot{\forall} t\colon [\ [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ] \dot{\Rightarrow} [\ \dot{t}' \stackrel{p}{=} [\ \dot{0} \dot{+} [$
$\dot{t}'\ ]\ ]\ ]\ ]\ ]\ \gg \dot{\forall} t\colon [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\rceil, p_0, c)]$

$[\mathrm{M3.2(f)} \stackrel{\text{stmt}}{\rightarrow} S' \vdash \dot{\forall} t\colon [\ \dot{t} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{t}\ ]\ ]\ ]\ ]$

$[\mathrm{M3.2(f)} \stackrel{\text{tex}}{\rightarrow}$ “
M3.2(f)”]

[M3.2(f) $\overset{\text{pyk}}{\to}$ “mendelson three two f”]

$\dot{*}$

[$\dot{\mathsf{x}} \overset{\text{tex}}{\to}$ “
\dot{#1.
}”]

[$\dot{\mathsf{x}} \overset{\text{pyk}}{\to}$ “$*$ peano var”]

$*'$

[$\mathsf{x}' \overset{\text{tex}}{\to}$ “#1.’”]

[$\mathsf{x}' \overset{\text{pyk}}{\to}$ “$*$ peano succ”]

$* \dot{:} *$

[$\mathsf{x} \dot{:} \mathsf{y} \overset{\text{tex}}{\to}$ “#1.
\mathop{\dot{\cdot}} #2.”]

[$\mathsf{x} \dot{:} \mathsf{y} \overset{\text{pyk}}{\to}$ “$*$ peano times $*$”]

$* \dot{+} *$

[$\mathsf{x} \dot{+} \mathsf{y} \overset{\text{tex}}{\to}$ “#1.
\mathop{\dot{+}} #2.”]

[$\mathsf{x} \dot{+} \mathsf{y} \overset{\text{pyk}}{\to}$ “$*$ peano plus $*$”]

$* \overset{\text{p}}{=} *$

[$\mathsf{x} \overset{\text{p}}{=} \mathsf{y} \overset{\text{tex}}{\to}$ “#1.
\stackrel{p}{=} #2.”]

[$\mathsf{x} \overset{\text{p}}{=} \mathsf{y} \overset{\text{pyk}}{\to}$ “$*$ peano is $*$”]

$*^{\mathcal{P}}$

[$\mathsf{x}^{\mathcal{P}} \overset{\text{val}}{\to} \mathsf{x} \overset{\text{r}}{=} \lceil \dot{\mathsf{x}} \rceil$]

$[\mathsf{x}^{\mathcal{P}} \overset{\text{tex}}{\to} \text{“\#1.}$
$\{\}\ \hat{}\ \{\backslash\text{cal P}\}\text{”}]$

$[\mathsf{x}^{\mathcal{P}} \overset{\text{pyk}}{\to} \text{“}* \text{ is peano var”}]$

$\dot{\neg}\, *$

$[\dot{\neg}\mathsf{x} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{neg}\}\backslash,\ \#1.\text{”}]$

$[\dot{\neg}\mathsf{x} \overset{\text{pyk}}{\to} \text{“peano not }*\text{”}]$

$* \mathbin{\dot{\wedge}} *$

$[\mathsf{x} \mathbin{\dot{\wedge}} \mathsf{y} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathsf{x} \mathbin{\dot{\wedge}} \mathsf{y} \doteqdot \dot{\neg}(\mathsf{x} \mathbin{\dot{\Rightarrow}} \dot{\neg}\mathsf{y})]\rceil)]$

$[\mathsf{x} \mathbin{\dot{\wedge}} \mathsf{y} \overset{\text{tex}}{\to} \text{“\#1.}$
$\backslash\text{mathrel}\{\backslash\text{dot}\{\backslash\text{wedge}\}\}\ \#2.\text{”}]$

$[\mathsf{x} \mathbin{\dot{\wedge}} \mathsf{y} \overset{\text{pyk}}{\to} \text{“}* \text{ peano and }*\text{”}]$

$* \mathbin{\dot{\vee}} *$

$[\mathsf{x} \mathbin{\dot{\vee}} \mathsf{y} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathsf{x} \mathbin{\dot{\vee}} \mathsf{y} \doteqdot [\ \dot{\neg}\mathsf{x}\ ] \mathbin{\dot{\Rightarrow}} \mathsf{y}]\rceil)]$

$[\mathsf{x} \mathbin{\dot{\vee}} \mathsf{y} \overset{\text{tex}}{\to} \text{“\#1.}$
$\backslash\text{mathrel}\{\backslash\text{dot}\{\backslash\text{vee}\}\}\ \#2.\text{”}]$

$[\mathsf{x} \mathbin{\dot{\vee}} \mathsf{y} \overset{\text{pyk}}{\to} \text{“}* \text{ peano or }*\text{”}]$

$\dot{\forall} *\colon *$

$[\dot{\forall}\mathsf{x}\colon \mathsf{y} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{forall}\}\ \#1.$
$\backslash\text{colon}\ \#2.\text{”}]$

$[\dot{\forall}\mathsf{x}\colon \mathsf{y} \overset{\text{pyk}}{\to} \text{“peano all }*\text{ indeed }*\text{”}]$

$\dot{\exists} *\colon *$

$[\dot{\exists}\mathsf{x}\colon \mathsf{y} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\dot{\exists}\mathsf{x}\colon \mathsf{y} \doteqdot \dot{\neg}\,\dot{\forall}\mathsf{x}\colon \dot{\neg}\mathsf{y}]\rceil)]$

$[\dot{\exists}\mathsf{x}\colon \mathsf{y} \overset{\text{tex}}{\to} \text{“}$
\dot{\exists} #1.
\colon #2.”]

$[\dot{\exists}\mathsf{x}\colon \mathsf{y} \overset{\text{pyk}}{\to} \text{“peano exist } * \text{ indeed } *\text{”}]$

$* \mathrel{\dot{\Rightarrow}} *$

$[\mathsf{x} \mathrel{\dot{\Rightarrow}} \mathsf{y} \overset{\text{tex}}{\to} \text{“}$#1.
\mathrel{\dot{\Rightarrow}} #2.”]

$[\mathsf{x} \mathrel{\dot{\Rightarrow}} \mathsf{y} \overset{\text{pyk}}{\to} \text{“}* \text{ peano imply } *\text{”}]$

$* \mathrel{\dot{\Leftrightarrow}} *$

$[\mathsf{x} \mathrel{\dot{\Leftrightarrow}} \mathsf{y} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathsf{x} \mathrel{\dot{\Leftrightarrow}} \mathsf{y} \mathrel{\ddot{=}} (\mathsf{x} \mathrel{\dot{\Rightarrow}} \mathsf{y}) \mathrel{\dot{\wedge}} (\mathsf{y} \mathrel{\dot{\Rightarrow}} \mathsf{x})]\rceil)]$

$[\mathsf{x} \mathrel{\dot{\Leftrightarrow}} \mathsf{y} \overset{\text{tex}}{\to} \text{“}$#1.
\mathrel{\dot{\Leftrightarrow}} #2.”]

$[\mathsf{x} \mathrel{\dot{\Leftrightarrow}} \mathsf{y} \overset{\text{pyk}}{\to} \text{“}* \text{ peano iff } *\text{”}]$

$* \trianglerighteq *$

$[\mathsf{x} \trianglerighteq \mathsf{y} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathsf{x} \trianglerighteq \mathsf{y} \mathrel{\ddot{=}} [\,\mathrm{MP}' \rhd \mathsf{x}\,] \rhd \mathsf{y}]\rceil)]$

$[\mathsf{x} \trianglerighteq \mathsf{y} \overset{\text{tex}}{\to} \text{“}$#1.
\unrhd #2.”]

$[\mathsf{x} \trianglerighteq \mathsf{y} \overset{\text{pyk}}{\to} \text{“}* \text{ macro modus ponens } *\text{”}]$

$* \trianglerighteq_{\mathrm{h}} *$

$[\mathsf{x} \trianglerighteq_{\mathrm{h}} \mathsf{y} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathsf{x} \trianglerighteq_{\mathrm{h}} \mathsf{y} \mathrel{\ddot{=}} [\,\mathrm{MP}'_{\mathrm{h}} \rhd \mathsf{x}\,] \rhd \mathsf{y}]\rceil)]$

$[\mathsf{x} \trianglerighteq_{\mathrm{h}} \mathsf{y} \overset{\text{tex}}{\to} \text{“}$#1.
\unrhd_h #2.”]

$[\mathsf{x} \trianglerighteq_{\mathrm{h}} \mathsf{y} \overset{\text{pyk}}{\to} \text{“}* \text{ hypothetical modus ponens } *\text{”}]$

The pyk compiler, version 0.grue.20050603 by Klaus Grue
GRD-2005-07-04.UTC:13:01:21.823959 = MJD-53555.TAI:13:01:53.823959 = LGT-4627198913823959e-6