Logiweb codex of peano commutativity

Up Help

S′, A1′, A2′, A3′, A4′, A5′, S1′, S2′, S3′, S4′, S5′, S6′, S7′, S8′, S9′, MP′, Gen′, peano commutativity, M Lemma 1.8, M Proposition 3.2(a), M Proposition 3.2(b), M Proposition 3.2(c), M Proposition 3.2(d), M Proposition 3.2(f) (i), M Proposition 3.2(f) (ii), M Proposition 3.2(f), M Proposition 3.2(g) (i), M Proposition 3.2(g) (ii), M Proposition 3.2(g), M Proposition 3.2(h)(i), M Proposition 3.2(h)$_{(g)(ii)}$, M Proposition 3.2(h)(ii), M Proposition 3.2(h), M Tautology A, M Tautology B,

S′

[S′ $\overset{\text{stmt}}{\rightarrow}$ x]

A1′

[A1′ $\overset{\text{proof}}{\rightarrow}$ Rule tactic]

[A1′ $\overset{\text{stmt}}{\rightarrow}$ S′ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon$ [$\underline{a} \Rightarrow$ [$\underline{b} \dot{\Rightarrow} \underline{a}$]]]

A2′

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

[A2′ $\overset{\text{stmt}}{\rightarrow}$ S′ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon$ [[$\underline{a} \Rightarrow$ [$\underline{b} \Rightarrow \underline{c}$]] $\Rightarrow$ [[$\underline{a} \Rightarrow \underline{b}$] $\Rightarrow$ [$\underline{a} \Rightarrow \underline{c}$]]]]

A3′

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

[A3′ $\overset{\text{stmt}}{\rightarrow}$ S′ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon$ [[[$\dot{\neg} \underline{b}$] $\Rightarrow \dot{\neg} \underline{a}$] $\Rightarrow$ [[[$\dot{\neg} \underline{b}$] $\Rightarrow \underline{a}$] $\Rightarrow \underline{b}$]]]

A4′

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

[A4′ $\overset{\text{stmt}}{\rightarrow}$ S′ $\vdash \forall \underline{c}\colon \forall \underline{a}\colon \forall \underline{x}\colon \forall \underline{b}\colon$ [$\lceil \underline{a} \rceil \equiv \langle \lceil \underline{b} \rceil \mid \lceil \underline{x} \rceil := \lceil \underline{c} \rceil \rangle \Vdash$ [[$\dot{\forall} \underline{x}\colon \underline{b}$] $\Rightarrow \underline{a}$]]]

A5′

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

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

S1′

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

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

S2′

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

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

S3′

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

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

S4′

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

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

S5′

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

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

S6′

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

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

S7′

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

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

S8′

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

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

S9′

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

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

MP′

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

[MP′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ]\ \vdash\ [\ \underline{a} \vdash \underline{b}\ ]\ ]$]

Gen′

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

[Gen′ $\overset{\text{stmt}}{\to}$ S′ $\vdash \forall \underline{x}\colon \forall \underline{a}\colon [\ \underline{a} \vdash \dot{\forall} \underline{x}\colon \underline{a}\ ]$]

peano commutativity

[peano commutativity $\overset{\text{prio}}{\to}$
Preassociative
[peano commutativity], [base], [bracket ∗ end bracket],
[big bracket ∗ end bracket], [math ∗ end math], [**flush left** [∗]], [x], [y], [z],

$[[* \bowtie *]]$, $[[* \xrightarrow{*} *]]$, [pyk], [tex], [name], [prio], $[*]$, $[\mathsf{T}]$, [if$(*,*,*)$], $[[* \overset{*}{\Rightarrow} *]]$, [val], [claim], $[\bot]$, [f$(*)$], $[(*)^{\mathrm{I}}]$, $[\mathsf{F}]$, $[\underline{0}]$, $[\underline{1}]$, $[\underline{2}]$, $[\underline{3}]$, $[\underline{4}]$, $[\underline{5}]$, $[\underline{6}]$, $[\underline{7}]$, $[\underline{8}]$, $[\underline{9}]$, [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], $[\langle * \mid * := * \rangle]$, $[\mathcal{M}(*)]$, $[\tilde{\mathcal{U}}(*)]$, $[\mathcal{U}(*)]$, $[\mathcal{U}^{\mathrm{M}}(*)]$, [**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], $[\mathrm{s}_0]$, [**zip**$(*,*)$], [**assoc**$_1(*,*,*)$], $[(*)^{\mathbf{p}}]$, [self], $[[* \doteqdot *]]$, $[[* \doteq *]]$, $[[* \doteq *]]$, $[[* \overset{\text{pyk}}{=} *]]$, $[[* \overset{\text{tex}}{=} *]]$, $[[* \overset{\text{name}}{=} *]]$, [**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$_1(*,*)$], $[[* \overset{\text{claim}}{=} *]]$, [checker], [**check**$(*,*)$], [**check**$_2(*,*,*)$], [**check**$_3(*,*,*)$], [**check**$^*(*,*)$], [**check**$^*_2(*,*,*)$], $[[*]^{\cdot}]$, $[[*]^{-}]$, $[[*]^{\circ}]$, [msg], $[[* \overset{\text{msg}}{=} *]]$, [<stmt>], [stmt], $[[* \overset{\text{stmt}}{=} *]]$, [HeadNil$'$], [HeadPair$'$], [Transitivity$'$], $[\perp\!\!\!\perp]$, [Contra$'$], $[\mathrm{T}'_{\mathrm{E}}]$, $[\mathrm{L}_1]$, $[\underline{*}]$, $[\mathcal{A}]$, $[\mathcal{B}]$, $[\mathcal{C}]$, $[\mathcal{D}]$, $[\mathcal{E}]$, $[\mathcal{F}]$, $[\mathcal{G}]$, $[\mathcal{H}]$, $[\mathcal{I}]$, $[\mathcal{J}]$, $[\mathcal{K}]$, $[\mathcal{L}]$, $[\mathcal{M}]$, $[\mathcal{N}]$, $[\mathcal{O}]$, $[\mathcal{P}]$, $[\mathcal{Q}]$, $[\mathcal{R}]$, $[\mathcal{S}]$, $[\mathcal{T}]$, $[\mathcal{U}]$, $[\mathcal{V}]$, $[\mathcal{W}]$, $[\mathcal{X}]$, $[\mathcal{Y}]$, $[\mathcal{Z}]$, $[\langle * \mid * := * \rangle]$, $[\langle {}^* * \mid * := * \rangle]$, $[\emptyset]$, [Remainder], $[(*)^{\mathbf{v}}]$, [intro$(*,*,*,*)$], [intro$(*,*,*)$], [error$(*,*)$], [error$_2(*,*)$], [proof$(*,*,*)$], [proof$_2(*,*)$], $[\mathcal{S}(*,*)]$, $[\mathcal{S}^{\mathrm{I}}(*,*)]$, $[\mathcal{S}^{\triangleright}(*,*)]$, $[\mathcal{S}^{\triangleright}_1(*,*,*)]$, $[\mathcal{S}^{\mathrm{E}}(*,*)]$, $[\mathcal{S}^{\mathrm{E}}_1(*,*,*)]$, $[\mathcal{S}^{+}(*,*)]$, $[\mathcal{S}^{+}_1(*,*,*)]$, $[\mathcal{S}^{-}(*,*)]$, $[\mathcal{S}^{-}_1(*,*,*)]$, $[\mathcal{S}^{*}(*,*)]$, $[\mathcal{S}^{*}_1(*,*,*)]$, $[\mathcal{S}^{*}_2(*,*,*,*)]$, $[\mathcal{S}^{@}(*,*)]$, $[\mathcal{S}^{@}_1(*,*,*)]$, $[\mathcal{S}^{\vdash}(*,*)]$, $[\mathcal{S}^{\vdash}_1(*,*,*,*)]$, $[\mathcal{S}^{\Vdash}(*,*)]$, $[\mathcal{S}^{\Vdash}_1(*,*,*,*)]$, $[\mathcal{S}^{\mathrm{i.e.}\cdot}(*,*)]$, $[\mathcal{S}^{\mathrm{i.e.}\cdot}_1(*,*,*,*)]$, $[\mathcal{S}^{\mathrm{i.e.}\cdot}_2(*,*,*,*,*)]$, $[\mathcal{S}^{\forall}(*,*)]$, $[\mathcal{S}^{\forall}_1(*,*,*,*)]$, $[\mathcal{S}^{;}(*,*)]$, $[\mathcal{S}^{;}_1(*,*,*)]$, $[\mathcal{S}^{;}_2(*,*,*,*)]$, $[\mathcal{T}(*)]$, [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], $[\mathrm{T}_{\mathrm{E}}]$, [ragged right], [ragged right expansion], [parm$(*,*,*)$], [parm$^*(*,*,*)$], [inst$(*,*)$], [inst$^*(*,*)$], [occur$(*,*,*)$], [occur$^*(*,*,*)$], [unify$(*=*,*)$], [unify$^*(*=*,*)$], [unify$_2(*=*,*)$], $[\mathrm{L}_{\mathrm{a}}]$, $[\mathrm{L}_{\mathrm{b}}]$, $[\mathrm{L}_{\mathrm{c}}]$, $[\mathrm{L}_{\mathrm{d}}]$, $[\mathrm{L}_{\mathrm{e}}]$, $[\mathrm{L}_{\mathrm{f}}]$, $[\mathrm{L}_{\mathrm{g}}]$, $[\mathrm{L}_{\mathrm{h}}]$, $[\mathrm{L}_{\mathrm{i}}]$, $[\mathrm{L}_{\mathrm{j}}]$, $[\mathrm{L}_{\mathrm{k}}]$, $[\mathrm{L}_{\mathrm{l}}]$, $[\mathrm{L}_{\mathrm{m}}]$, $[\mathrm{L}_{\mathrm{n}}]$, $[\mathrm{L}_{\mathrm{o}}]$, $[\mathrm{L}_{\mathrm{p}}]$, $[\mathrm{L}_{\mathrm{q}}]$, $[\mathrm{L}_{\mathrm{r}}]$, $[\mathrm{L}_{\mathrm{s}}]$, $[\mathrm{L}_{\mathrm{t}}]$, $[\mathrm{L}_{\mathrm{u}}]$, $[\mathrm{L}_{\mathrm{v}}]$, $[\mathrm{L}_{\mathrm{w}}]$, $[\mathrm{L}_{\mathrm{x}}]$, $[\mathrm{L}_{\mathrm{y}}]$, $[\mathrm{L}_{\mathrm{z}}]$, $[\mathrm{L}_{\mathrm{A}}]$, $[\mathrm{L}_{\mathrm{B}}]$, $[\mathrm{L}_{\mathrm{C}}]$, $[\mathrm{L}_{\mathrm{D}}]$, $[\mathrm{L}_{\mathrm{E}}]$, $[\mathrm{L}_{\mathrm{F}}]$, $[\mathrm{L}_{\mathrm{G}}]$, $[\mathrm{L}_{\mathrm{H}}]$, $[\mathrm{L}_{\mathrm{I}}]$, $[\mathrm{L}_{\mathrm{J}}]$, $[\mathrm{L}_{\mathrm{K}}]$, $[\mathrm{L}_{\mathrm{L}}]$, $[\mathrm{L}_{\mathrm{M}}]$, $[\mathrm{L}_{\mathrm{N}}]$, $[\mathrm{L}_{\mathrm{O}}]$, $[\mathrm{L}_{\mathrm{P}}]$, $[\mathrm{L}_{\mathrm{Q}}]$, $[\mathrm{L}_{\mathrm{R}}]$, $[\mathrm{L}_{\mathrm{S}}]$, $[\mathrm{L}_{\mathrm{T}}]$, $[\mathrm{L}_{\mathrm{U}}]$, $[\mathrm{L}_{\mathrm{V}}]$, $[\mathrm{L}_{\mathrm{W}}]$, $[\mathrm{L}_{\mathrm{X}}]$, $[\mathrm{L}_{\mathrm{Y}}]$, $[\mathrm{L}_{\mathrm{Z}}]$, $[\mathrm{L}_{?}]$, [Reflexivity], [Reflexivity$_1$], [Commutativity], [Commutativity$_1$], [<tactic>], [tactic], $[[* \overset{\text{tactic}}{=} *]]$, $[\mathcal{P}(*,*,*)]$, $[\mathcal{P}^*(*,*,*)]$, $[\mathrm{p}_0]$, [conclude$_1(*,*)$], [conclude$_2(*,*,*)$], [conclude$_3(*,*,*,*)$],

$[\mathrm{conclude}_4(*,*)]$, [peano], $[\dot{0}]$, $[\dot{1}]$, $[\dot{2}]$, $[\dot{a}]$, $[\dot{b}]$, $[\dot{c}]$, $[\dot{d}]$, $[\dot{e}]$, $[\dot{f}]$, $[\dot{g}]$, $[\dot{h}]$, $[\dot{i}]$, $[\dot{j}]$, $[\dot{k}]$, $[\dot{l}]$, $[\dot{m}]$, $[\dot{n}]$, $[\dot{o}]$, $[\dot{p}]$, $[\dot{q}]$, $[\dot{r}]$, $[\dot{s}]$, $[\dot{t}]$, $[\dot{u}]$, $[\dot{v}]$, $[\dot{w}]$, $[\dot{x}]$, $[\dot{y}]$, $[\dot{z}]$, [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)], [S′], [A1′], [A2′], [A3′], [A4′], [A5′], [S1′], [S2′], [S3′], [S4′], [S5′], [S6′], [S7′], [S8′], [S9′], [MP′], [Gen′], [L3.2(a)′], [M1.7], [MP$'_{\mathrm{h}}$], [Hypothesize], [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)], [M Lemma 1.8], [M Proposition 3.2(a)], [M Proposition 3.2(b)], [M Proposition 3.2(c)], [M Proposition 3.2(d)], [M Proposition 3.2(f) (i)], [M Proposition 3.2(f) (ii)], [M Proposition 3.2(f)], [M Proposition 3.2(g) (i)], [M Proposition 3.2(g) (ii)], [M Proposition 3.2(g)], [M Proposition 3.2(h)(i)], [M Proposition 3.2(h)$_{(g)(ii)}$], [M Proposition 3.2(h)(ii)], [M Proposition 3.2(h)], [M Tautology A], [M Tautology B];

Preassociative

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

Preassociative

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

Preassociative

[$*0$], [$*1$], [0b], [$*$-color$(*)$], [$*$-color$^*(*)$];

Preassociative

[$*$ ’ $*$], [$*$ ‘ $*$];

Preassociative

$[*^{\mathrm{H}}]$, $[*^{\mathrm{T}}]$, $[*^{\mathrm{U}}]$, $[*^{\mathrm{h}}]$, $[*^{\mathrm{t}}]$, $[*^{\mathrm{s}}]$, $[*^{\mathrm{c}}]$, $[*^{\mathrm{d}}]$, $[*^{\mathrm{a}}]$, $[*^{\mathrm{C}}]$, $[*^{\mathrm{M}}]$, $[*^{\mathrm{B}}]$, $[*^{\mathrm{r}}]$, $[*^{\mathrm{i}}]$, $[*^{\mathrm{d}}]$, $[*^{\mathrm{R}}]$, $[*^0]$, $[*^1]$, $[*^2]$, $[*^3]$, $[*^4]$, $[*^5]$, $[*^6]$, $[*^7]$, $[*^8]$, $[*^9]$, $[*^{\mathrm{E}}]$, $[*^{\mathcal{V}}]$, $[*^{\mathcal{C}}]$, $[*^{\mathcal{C}^*}]$, $[*']$;

Preassociative

$[*\cdot *]$, $[*\cdot_0 *]$, $[*\dot{:}*]$;

Preassociative

$[*+*]$, $[*+_0 *]$, $[*+_1 *]$, $[*-*]$, $[*-_0 *]$, $[*-_1 *]$, $[*\dot{+}*]$;

Preassociative

$[*\cup\{*\}]$, $[*\cup *]$, $[*\backslash\{*\}]$;

Postassociative

$[*\mathbin{\dot{\cdot}}*]$, $[*\mathbin{\underline{\dot{\cdot}}}*]$, $[*\mathbin{\underline{::}}*]$, $[*\mathbin{\underline{+2*}}*]$, [$*::*$], [$*+2**$];

Postassociative

$[*,*]$;

Preassociative

$[*\overset{\mathrm{B}}{\approx}*]$, $[*\overset{\mathrm{D}}{\approx}*]$, $[*\overset{\mathrm{C}}{\approx}*]$, $[*\overset{\mathrm{P}}{\approx}*]$, $[*\approx *]$, $[*=*]$, $[*\overset{+}{\to}*]$, $[*\overset{\mathrm{t}}{=}*]$, $[*\overset{\mathrm{t}^*}{=}*]$, $[*\overset{\mathrm{r}}{=}*]$,

$[* \in_{\mathrm{t}} *], [* \subseteq_{\mathrm{T}} *], [* \overset{\mathrm{T}}{=} *], [* \overset{\mathrm{s}}{=} *]$, [* free in *], [* free in* *], [* free for * in *],
[* free for* * in *], $[* \in_{\mathrm{c}} *], [* < *], [* <' *], [* \leq' *], [* \overset{\mathrm{p}}{=} *], [*^{\mathcal{P}}]$;
Preassociative
$[\neg *], [\dot{\neg} *]$;
Preassociative
$[* \wedge *], [* \ddot{\wedge} *], [* \tilde{\wedge} *], [* \wedge_{\mathrm{c}} *], [* \dot{\wedge} *]$;
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
$[\lambda * . *], [\Lambda *]$, [**if** * **then** * **else** *], [**let** * = * **in** *], [**let** * $\ddot{=}$ * in *];
Preassociative
$[*^{\mathrm{I}}], [*^{\triangleright}], [*^{\mathrm{V}}], [*^{+}], [*^{-}], [*^{*}]$;
Preassociative
$[* @ *], [* \triangleright *], [* \blacktriangleright *], [* \gg *]$;
Postassociative
$[* \vdash *], [* \vDash *]$, [* i.e. *];
Preassociative
$[\forall *: *]$;
Postassociative
$[* \oplus *]$;
Postassociative
$[*; *]$;
Preassociative
[* proves *];
Preassociative
[* **proof of** * : *], [Line * : * $\gg$ *; *], [Last line * $\gg$ * $\square$],
[Line * : Premise $\gg$ *; *], [Line * : Side-condition $\gg$ *; *], [Arbitrary $\gg$ *; *],
[Local $\gg$ * = *; *];
Postassociative
[* then *], [*[*]*];
Preassociative
[*&*];
Preassociative
[**];]

[peano commutativity $\overset{\mathrm{pyk}}{\rightarrow}$ "peano commutativity"]

M Lemma 1.8

[M Lemma 1.8 $\overset{\text{proof}}{\rightsquigarrow}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{b}\colon [\ [\ A2' \gg [\ [\ \underline{b} \Rightarrow [\ [\ \underline{b} \Rightarrow \underline{b}\ ]\ \Rightarrow \underline{b}\ ]\ ] \Rightarrow [\ [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ ;\ [\ [\ A1' \gg [\ \underline{b} \Rightarrow [\ [\ \underline{b} \Rightarrow \underline{b}\ ]\ \Rightarrow \underline{b}\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ \underline{b} \Rightarrow [\ [\ \underline{b} \Rightarrow \underline{b}\ ]\ \Rightarrow \underline{b}\ ]\ ]\ \Rightarrow [\ [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ \rhd [\ \underline{b} \Rightarrow [\ [\ \underline{b} \Rightarrow \underline{b}\ ]\ \Rightarrow \underline{b}\ ]\ ]\ ]\ \gg [\ [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ;\ [\ [\ A1' \gg [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ;\ [\ [\ [\ MP' \rhd [\ [\ \underline{b} \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ \Rightarrow [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ \rhd [\ \underline{b} \Rightarrow [\ [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ \gg [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]\ ]\ ]\ ]\ ]\ \rfloor, p_0, c)$]

[M Lemma 1.8 $\overset{\text{stmt}}{\rightsquigarrow}$ $S' \vdash \forall \underline{b}\colon [\ \underline{b} \Rightarrow \underline{b}\ ]\ ]$

[M Lemma 1.8 $\overset{\text{tex}}{\rightsquigarrow}$ "M\ Lemma\ 1.8"]

[M Lemma 1.8 $\overset{\text{pyk}}{\rightsquigarrow}$ "mendelson lemma one eight"]

M Proposition 3.2(a)

[M Proposition 3.2(a) $\overset{\text{proof}}{\rightsquigarrow}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{t}\colon [\ [\ S5' \gg [\ [\ \underline{t} \dot{+} \dot{0}\ ]\ \overset{p}{=}\ \underline{t}\ ]\ ]\ ;\ [\ [\ S1' \gg [\ [\ [\ \underline{t} \dot{+} \dot{0}\ ]\ \overset{p}{=}\ \underline{t}\ ]\ \Rightarrow [\ [\ [\ \underline{t} \dot{+} \dot{0}\ ]\ \overset{p}{=}\ \underline{t}\ ]\ \Rightarrow [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ [\ \underline{t} \dot{+} \dot{0}\ ]\ \overset{p}{=}\ \underline{t}\ ]\ \Rightarrow [\ [\ [\ \underline{t} \dot{+} \dot{0}\ ]\ \overset{p}{=}\ \underline{t}\ ]\ \Rightarrow [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ \rhd [\ [\ \underline{t} \dot{+} \dot{0}\ ]\ \overset{p}{=}\ \underline{t}\ ]\ ]\ \gg [\ [\ [\ \underline{t} \dot{+} \dot{0}\ ]\ \overset{p}{=}\ \underline{t}\ ]\ \Rightarrow [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ;\ [\ [\ [\ MP' \rhd [\ [\ [\ \underline{t} \dot{+} \dot{0}\ ]\ \overset{p}{=}\ \underline{t}\ ]\ \Rightarrow [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ \rhd [\ [\ [\ \underline{t} \dot{+} \dot{0}\ ]\ \overset{p}{=}\ \underline{t}\ ]\ ]\ \gg [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ ]\ \rfloor, p_0, c)$]

[M Proposition 3.2(a) $\overset{\text{stmt}}{\rightsquigarrow}$ $S' \vdash \forall \underline{t}\colon [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]$

[M Proposition 3.2(a) $\overset{\text{tex}}{\rightsquigarrow}$ "M\ Proposition\ 3.2(a)"]

[M Proposition 3.2(a) $\overset{\text{pyk}}{\rightsquigarrow}$ "mendelson proposition three two a"]

M Proposition 3.2(b)

[M Proposition 3.2(b) $\overset{\text{proof}}{\rightsquigarrow}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{t}\colon \forall \underline{r}\colon [\ [\ S1' \gg [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ]\ \Rightarrow [\ [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ M\ Tautology\ A \rhd [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ]\ \Rightarrow [\ [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ \gg [\ [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ \Rightarrow [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ]\ \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ ;\ [\ [\ M\ Proposition\ 3.2(a) \gg [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]\ ;\ [\ [\ [\ MP' \rhd [\ [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ \Rightarrow [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ]\ \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ \rhd [\ \underline{t} \overset{p}{=} \underline{t}\ ]\ ]\ \gg [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ]\ \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]\ ]\ ]\ ]\ \rfloor, p_0, c)$]

[M Proposition 3.2(b) $\overset{\text{stmt}}{\rightsquigarrow}$ $S' \vdash \forall \underline{t}\colon \forall \underline{r}\colon [\ [\ \underline{t} \overset{p}{=} \underline{r}\ ]\ \Rightarrow [\ \underline{r} \overset{p}{=} \underline{t}\ ]\ ]\ ]$

[M Proposition 3.2(b) $\overset{\text{tex}}{\rightsquigarrow}$ "M\ Proposition\ 3.2(b)"]

[M Proposition 3.2(b) $\overset{\text{pyk}}{\rightsquigarrow}$ "mendelson proposition three two b"]

M Proposition 3.2(c)

[M Proposition 3.2(c) $\overset{\text{proof}}{\rightarrow}$ $\lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{\mathrm{t}}\colon \forall \underline{\mathrm{r}}\colon \forall \underline{\mathrm{s}}\colon [\ [\ \mathrm{S1}' \gg [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ] \Rightarrow [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{M\ Proposition\ 3.2(b)} \gg [\ [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{r}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{M\ Tautology\ B} \rhd [\ [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{r}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ]\ ]\ ]\ ] \rhd [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ] \Rightarrow [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ]\ ] \gg [\ [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{r}}\ ] \Rightarrow [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ] \Rightarrow [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ]\ ]\ ]\rceil, \mathrm{p}_0, \mathsf{c})$]

[M Proposition 3.2(c) $\overset{\text{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathrm{t}}\colon \forall \underline{\mathrm{r}}\colon \forall \underline{\mathrm{s}}\colon [\ [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{r}}\ ] \Rightarrow [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ] \Rightarrow [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]$]

[M Proposition 3.2(c) $\overset{\text{tex}}{\rightarrow}$ "M\ Proposition\ 3.2(c)"]

[M Proposition 3.2(c) $\overset{\text{pyk}}{\rightarrow}$ "mendelson proposition three two c"]

M Proposition 3.2(d)

[M Proposition 3.2(d) $\overset{\text{proof}}{\rightarrow}$ $\lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash \forall \underline{\mathrm{r}}\colon \forall \underline{\mathrm{t}}\colon \forall \underline{\mathrm{s}}\colon [\ [\ \mathrm{M\ Proposition\ 3.2(c)} \gg [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{M\ Tautology\ A} \rhd [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ] \gg [\ [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ] \Rightarrow [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{M\ Proposition\ 3.2(b)} \gg [\ [\ \underline{\mathrm{s}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ \mathrm{M\ Tautology\ B} \rhd [\ [\ \underline{\mathrm{s}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ] \rhd [\ [\ \underline{\mathrm{t}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ] \Rightarrow [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ] \gg [\ [\ \underline{\mathrm{s}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{M\ Tautology\ A} \rhd [\ [\ \underline{\mathrm{s}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ] \gg [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ [\ \underline{\mathrm{s}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\rceil, \mathrm{p}_0, \mathsf{c})$]

[M Proposition 3.2(d) $\overset{\text{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \forall \underline{\mathrm{r}}\colon \forall \underline{\mathrm{t}}\colon \forall \underline{\mathrm{s}}\colon [\ [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ [\ \underline{\mathrm{s}} \overset{\mathrm{p}}{=} \underline{\mathrm{t}}\ ] \Rightarrow [\ \underline{\mathrm{r}} \overset{\mathrm{p}}{=} \underline{\mathrm{s}}\ ]\ ]\ ]$]

[M Proposition 3.2(d) $\overset{\text{tex}}{\rightarrow}$ "M\ Proposition\ 3.2(d)"]

[M Proposition 3.2(d) $\overset{\text{pyk}}{\rightarrow}$ "mendelson proposition three two d"]

M Proposition 3.2(f) (i)

[M Proposition 3.2(f) (i) $\overset{\text{proof}}{\rightarrow}$ $\lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash [\ [\ \mathrm{S5}' \gg [\ [\ \dot{0} \dot{+} \dot{0}\ ] \overset{\mathrm{p}}{=} \dot{0}\ ]\ ]\ ;\ [\ [\ \mathrm{M\ Proposition\ 3.2(b)} \gg [\ [\ [\ \dot{0} \dot{+} \dot{0}\ ] \overset{\mathrm{p}}{=} \dot{0}\ ] \Rightarrow [\ \dot{0} \overset{\mathrm{p}}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{MP}' \rhd [\ [\ [\ \dot{0} \dot{+} \dot{0}\ ] \overset{\mathrm{p}}{=} \dot{0}\ ] \Rightarrow [\ \dot{0} \overset{\mathrm{p}}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ]\ ] \rhd [\ [\ \dot{0} \dot{+} \dot{0}\ ] \overset{\mathrm{p}}{=} \dot{0}\ ]\ ] \gg [\ \dot{0} \overset{\mathrm{p}}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ]\ ]\ ]\rceil, \mathrm{p}_0, \mathsf{c})$]

[M Proposition 3.2(f) (i) $\overset{\text{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash [\ \dot{0} \overset{\mathrm{p}}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]$]

[M Proposition 3.2(f) (i) $\overset{\text{tex}}{\rightarrow}$ "M\ Proposition\ 3.2(f)\ (i)"]

[M Proposition 3.2(f) (i) $\overset{\text{pyk}}{\to}$ “mendelson proposition three two f i”]

M Proposition 3.2(f) (ii)

[M Proposition 3.2(f) (ii) $\overset{\text{proof}}{\to}$ $\lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash [\ [\ \mathrm{S6}' \gg [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ] \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{S2}' \gg [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{M\ Proposition\ 3.2(d)} \gg [\ [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ] \Rightarrow [\ [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ] \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ \mathrm{M\ Tautology\ B} \rhd [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ]\ ]\ ] \rhd [\ [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ] \Rightarrow [\ [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ] \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ] \gg [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ] \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{M\ Tautology\ A} \rhd [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ] \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ] \gg [\ [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ] \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ] \Rightarrow [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ \mathrm{MP}' \rhd [\ [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ] \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ] \Rightarrow [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ] \rhd [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ] \overset{\text{p}}{=} [\ [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]'\ ]\ ]\ ] \gg [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{Gen}' \rhd [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ] \gg \dot{\forall}\dot{\mathsf{x}}\colon [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ], \mathrm{p}_0, \mathsf{c})]$

[M Proposition 3.2(f) (ii) $\overset{\text{stmt}}{\to}$ $\mathrm{S}' \vdash \dot{\forall}\dot{\mathsf{x}}\colon [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]$

[M Proposition 3.2(f) (ii) $\overset{\text{tex}}{\to}$ “M\ Proposition\ 3.2(f)\ (ii)”]

[M Proposition 3.2(f) (ii) $\overset{\text{pyk}}{\to}$ “mendelson proposition three two f ii”]

M Proposition 3.2(f)

[M Proposition 3.2(f) $\overset{\text{proof}}{\to}$ $\lambda\mathsf{c}.\lambda\mathsf{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash [\ [\ \mathrm{S9}' \gg [\ [\ \dot{0} \overset{\text{p}}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ] \Rightarrow [\ [\ \dot{\forall}\dot{\mathsf{x}}\colon [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ] \Rightarrow \dot{\forall}\dot{\mathsf{x}}\colon [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{M\ Proposition\ 3.2(f)\ (i)} \gg [\ \dot{0} \overset{\text{p}}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ \mathrm{MP}' \rhd [\ [\ \dot{0} \overset{\text{p}}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ] \Rightarrow [\ [\ \dot{\forall}\dot{\mathsf{x}}\colon [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ] \Rightarrow \dot{\forall}\dot{\mathsf{x}}\colon [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ]\ ]\ ]\ ]\ ] \rhd [\ \dot{0} \overset{\text{p}}{=} [\ \dot{0} \dot{+} \dot{0}\ ]\ ]\ ] \gg [\ [\ \dot{\forall}\dot{\mathsf{x}}\colon [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ] \Rightarrow \dot{\forall}\dot{\mathsf{x}}\colon [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ \mathrm{M\ Proposition\ 3.2(f)\ (ii)} \gg \dot{\forall}\dot{\mathsf{x}}\colon [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ \mathrm{MP}' \rhd [\ [\ \dot{\forall}\dot{\mathsf{x}}\colon [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ] \Rightarrow \dot{\forall}\dot{\mathsf{x}}\colon [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ]\ ]\ ]\ ] \rhd \dot{\forall}\dot{\mathsf{x}}\colon [\ [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ]\ ] \Rightarrow [\ \dot{\mathsf{x}}' \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}'\ ]\ ]\ ]\ ]\ ]\ ] \gg \dot{\forall}\dot{\mathsf{x}}\colon [\ \dot{\mathsf{x}} \overset{\text{p}}{=} [\ \dot{0} \dot{+} [\ \dot{\mathsf{x}}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ], \mathrm{p}_0, \mathsf{c})]$

[M Proposition 3.2(f) $\overset{\text{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \dot{\forall}\dot{\mathrm{x}}\colon [\, \dot{\mathrm{x}} \overset{\mathrm{p}}{=} [\, \dot{0} \dot{+} [\, \dot{\mathrm{x}} \,] \,] \,]$]

[M Proposition 3.2(f) $\overset{\text{tex}}{\rightarrow}$ "M\ Proposition\ 3.2(f)"]

[M Proposition 3.2(f) $\overset{\text{pyk}}{\rightarrow}$ "mendelson proposition three two f"]

M Proposition 3.2(g) (i)

[M Proposition 3.2(g) (i) $\overset{\text{proof}}{\rightarrow}$ $\lambda\mathsf{c}.\lambda\mathrm{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash [\, [\, \mathrm{S5}' \gg [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \,] ; [\, [\, \mathrm{S5}' \gg [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}} \,] \,] \,] ; [\, [\, \mathrm{S2}' \gg [\, [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}} \,] \,] \Rightarrow [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \,] \,] ; [\, [\, [\, [\, \mathrm{MP}' \rhd [\, [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}} \,] \,] \Rightarrow [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \,] \,] \rhd [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}} \,] \,] \,] \gg [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \,] ; [\, [\, \mathrm{M\ Proposition\ 3.2(d)} \gg [\, [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \Rightarrow [\, [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \,] \,] \,] \,] ; [\, [\, [\, [\, \mathrm{MP}' \rhd [\, [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \Rightarrow [\, [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \,] \,] \,] \,] \rhd [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \,] \gg [\, [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \,] \,] \,] ; [\, [\, [\, [\, \mathrm{MP}' \rhd [\, [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \,] \,] \,] \,] \rhd [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \overset{\mathrm{p}}{=} [\, \dot{\mathrm{x}}' \,] \,] \,] \gg [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \,] \,] \,] ; [\, [\, \mathrm{Gen}' \rhd [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \,] \,] \gg \dot{\forall}\dot{\mathrm{x}}\colon [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \,] \,] \,] \,] \,] \,] \,] \,] \rceil, \mathrm{p}_0, \mathsf{c})]$

[M Proposition 3.2(g) (i) $\overset{\text{stmt}}{\rightarrow}$ $\mathrm{S}' \vdash \dot{\forall}\dot{\mathrm{x}}\colon [\, [\, \dot{\mathrm{x}}' \dot{+} \dot{0} \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} \dot{0} \,]' \,] \,]$]

[M Proposition 3.2(g) (i) $\overset{\text{tex}}{\rightarrow}$ "M\ Proposition\ 3.2(g)\ (i)"]

[M Proposition 3.2(g) (i) $\overset{\text{pyk}}{\rightarrow}$ "mendelson proposition three two g i"]

M Proposition 3.2(g) (ii)

[M Proposition 3.2(g) (ii) $\overset{\text{proof}}{\rightarrow}$ $\lambda\mathsf{c}.\lambda\mathrm{x}.\mathcal{P}(\lceil \mathrm{S}' \vdash [\, [\, \mathrm{S6}' \gg [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}}' \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \,] \,] ; [\, [\, \mathrm{S2}' \gg [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \,] \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \,] ; [\, [\, \mathrm{M\ Proposition\ 3.2(c)} \gg [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}}' \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \,] \Rightarrow [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}}' \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \,] \,] ; [\, [\, [\, \mathrm{M\ Tautology\ A} \rhd [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}}' \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \,] \Rightarrow [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}}' \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \,] \,] \gg [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \Rightarrow [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}}' \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}}' \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \,] ; [\, [\, [\, [\, \mathrm{M\ Tautology\ B} \rhd [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \,] \rhd [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \Rightarrow [\, [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}}' \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}} \,] \,]' \,] \Rightarrow [\, [\, \dot{\mathrm{x}}' \dot{+} [\, \dot{\mathrm{y}}' \,] \,] \overset{\mathrm{p}}{=} [\, [\, \dot{\mathrm{x}} \dot{+} [\, \dot{\mathrm{y}} \,] \,]'' \,] \,] \,] \,] \,] \gg [\, [\, [\,$

$\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x}' \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]]]]$; $[[[$ M Tautology A $\triangleright$ $[[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x}' \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]]]] \gg [[[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x}' \dot{+} [\dot{y}]]']] \Rightarrow [[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]]]]$; $[[[$ MP$' \triangleright$ $[[[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x}' \dot{+} [\dot{y}]]']] \Rightarrow [[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]]]] \triangleright [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x}' \dot{+} [\dot{y}]]']]] \gg [[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]]]$; $[[$ S6$' \gg [[\dot{x} \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']]]$; $[[$ S2$' \gg [[[\dot{x} \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]]]$; $[[$ M Proposition 3.2(d) $\gg [[[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']] \Rightarrow [[[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]']]]]]$; $[[[[$ M Tautology B $\triangleright$ $[[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]]] \triangleright [[[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[[\dot{x} \dot{+} [\dot{y}]]'']] \Rightarrow [[[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]']]]]] \gg [[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]']]]]]$; $[[[$ M Tautology A $\triangleright$ $[[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]']]]]] \gg [[[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']] \Rightarrow [[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]']]]]]$; $[[[[$ MP$' \triangleright$ $[[[\dot{x} \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]]] \triangleright [[\dot{x} \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']]] \gg [[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]]$; $[[[[$ MP$' \triangleright$ $[[[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']] \Rightarrow [[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]']]]] \triangleright [[\dot{x} \dot{+} [\dot{y}']]' \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]'']]] \gg [[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]']]]]$; $[[$ Gen$' \triangleright$ $[[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]']]]] \gg \forall \dot{y}$: $[[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]'], \mathfrak{p}_0, \mathsf{c})]$

[M Proposition 3.2(g) (ii) $\overset{\text{stmt}}{\rightarrow}$ S$' \vdash \forall \dot{y}$: $[[[\dot{x}' \dot{+} [\dot{y}]] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}]]']] \Rightarrow [[\dot{x}' \dot{+} [\dot{y}']] \overset{p}{=} [[\dot{x} \dot{+} [\dot{y}']]']]]$]

[M Proposition 3.2(g) (ii) $\overset{\text{tex}}{\rightarrow}$ "M\ Proposition\ 3.2(g)\ (ii)"]

[M Proposition 3.2(g) (ii) $\overset{\text{pyk}}{\rightarrow}$ "mendelson proposition three two g ii"]

M Proposition 3.2(g)

$[\text{M Proposition 3.2(g)} \stackrel{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash [\ [\ S9' \gg [\ [\ \dot{\forall}\dot{x}\colon [\ [\ \dot{x}' \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} \dot{0}\ ]\ '\ ]\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x}' \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ]\ \dot{\Rightarrow} \dot{\forall}\dot{y}\colon [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ \text{M Proposition 3.2(g) (i)} \gg \dot{\forall}\dot{x}\colon [\ [\ \dot{x}' \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} \dot{0}\ ]\ '\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ \dot{\forall}\dot{x}\colon [\ [\ \dot{x}' \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} \dot{0}\ ]\ '\ ]\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x}' \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ]\ \dot{\Rightarrow} \dot{\forall}\dot{y}\colon [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ]\ \rhd \dot{\forall}\dot{x}\colon [\ [\ \dot{x}' \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} \dot{0}\ ]\ '\ ]\ ]\ ]\ \gg [\ [\ \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x}' \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ]\ \dot{\Rightarrow} \dot{\forall}\dot{y}\colon [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ;\ [\ [\ \text{M Proposition 3.2(g) (ii)} \gg \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x}' \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ MP' \rhd [\ [\ \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x}' \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ]\ \dot{\Rightarrow} \dot{\forall}\dot{y}\colon [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ ]\ ]\ \rhd \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x}' \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ]\ \gg \dot{\forall}\dot{y}\colon [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ \rceil, p_0, c)]$

$[\text{M Proposition 3.2(g)} \stackrel{\text{stmt}}{\rightarrow} S' \vdash \dot{\forall}\dot{y}\colon [\ [\ \dot{x}' \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ]\ '\ ]\ ]\ ]$

[M Proposition 3.2(g) $\stackrel{\text{tex}}{\rightarrow}$ “M\ Proposition\ 3.2(g)”]

[M Proposition 3.2(g) $\stackrel{\text{pyk}}{\rightarrow}$ “mendelson proposition three two g”]

M Proposition 3.2(h)(i)

$[\text{M Proposition 3.2(h)(i)} \stackrel{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash [\ [\ S5' \gg [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{x}\ ]\ ]\ ]\ ;\ [\ [\ \text{M Proposition 3.2(f)} \gg \dot{\forall}\dot{x}\colon [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ A4' @ [\ \dot{x}\ ]\ ]\ \gg [\ [\ \dot{\forall}\dot{x}\colon [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ \dot{\Rightarrow} [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ \dot{\forall}\dot{x}\colon [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ \dot{\Rightarrow} [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ \rhd \dot{\forall}\dot{x}\colon [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ \gg [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ;\ [\ [\ \text{M Proposition 3.2(c)} \gg [\ [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{x}\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{x}\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ \rhd [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{x}\ ]\ ]\ ]\ \gg [\ [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ MP' \rhd [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ \rhd [\ \dot{x} \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ \gg [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ;\ [\ [\ Gen' \rhd [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ \gg \dot{\forall}\dot{x}\colon [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ \rceil, p_0, c)]$

$[\text{M Proposition 3.2(h)(i)} \stackrel{\text{stmt}}{\rightarrow} S' \vdash \dot{\forall}\dot{x}\colon [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]$

[M Proposition 3.2(h)(i) $\stackrel{\text{tex}}{\rightarrow}$ “M\ Proposition\ 3.2(h)(i)”]

[M Proposition 3.2(h)(i) $\overset{\text{pyk}}{\to}$ “mendelson proposition three two h i”]

M Proposition 3.2(h)$_{\text{(g)(ii)}}$

[M Proposition 3.2(h)$_{\text{(g)(ii)}}$ $\overset{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\ulcorner$S′ ⊢ [[$\dot\forall\dot y$: [[$\dot x' \dot+$ [$\dot y$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]]] ⊢ [[[A4′ @ [$\dot z$]] ≫ [[$\dot\forall\dot y$: [[$\dot x' \dot+$ [$\dot y$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]]] ⇒ [[$\dot x' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot z$]] ′]]]] ; [[[[MP′ ▷ [[$\dot\forall\dot y$: [[$\dot x' \dot+$ [$\dot y$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]]] ⇒ [[$\dot x' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot z$]] ′]]]] ▷ $\dot\forall\dot y$: [[$\dot x' \dot+$ [$\dot y$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]]] ≫ [[$\dot x' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot z$]] ′]]] ; [[[Gen′ ▷ [[$\dot x' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot z$]] ′]]] ≫ $\dot\forall\dot x$: [[$\dot x' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot z$]] ′]]] ; [[[A4′ @ [$\dot y$]] ≫ [[$\dot\forall\dot x$: [[$\dot x' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot z$]] ′]]] ⇒ [[$\dot y' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot z$]] ′]]]] ; [[[[MP′ ▷ [[$\dot\forall\dot x$: [[$\dot x' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot z$]] ′]]] ⇒ [[$\dot y' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot z$]] ′]]]] ▷ $\dot\forall\dot x$: [[$\dot x' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot z$]] ′]]] ≫ [[$\dot y' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot z$]] ′]]] ; [[[Gen′ ▷ [[$\dot y' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot z$]] ′]]] ≫ $\dot\forall\dot z$: [[$\dot y' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot z$]] ′]]] ; [[[A4′ @ [$\dot x$]] ≫ [[$\dot\forall\dot z$: [[$\dot y' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot z$]] ′]]] ⇒ [[$\dot y' \dot+$ [$\dot x$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]]]] ; [[[MP′ ▷ [[$\dot\forall\dot z$: [[$\dot y' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot z$]] ′]]] ⇒ [[$\dot y' \dot+$ [$\dot x$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]]]] ▷ $\dot\forall\dot z$: [[$\dot y' \dot+$ [$\dot z$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot z$]] ′]]] ≫ [[$\dot y' \dot+$ [$\dot x$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]]]]]]]]]]]] ⌋, p_0, c)]

[M Proposition 3.2(h)$_{\text{(g)(ii)}}$ $\overset{\text{stmt}}{\to}$ S′ ⊢ [[$\dot\forall\dot y$: [[$\dot x' \dot+$ [$\dot y$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]]] ⊢ [[$\dot y' \dot+$ [$\dot x$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]]]]

[M Proposition 3.2(h)$_{\text{(g)(ii)}}$ $\overset{\text{tex}}{\to}$ “M\ Proposition\ 3.2(h)_{(g)(ii)}”]

[M Proposition 3.2(h)$_{\text{(g)(ii)}}$ $\overset{\text{pyk}}{\to}$ “mendelson proposition three two h g ii”]

M Proposition 3.2(h)(ii)

[M Proposition 3.2(h)(ii) $\overset{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\ulcorner$S′ ⊢ [[S6′ ≫ [[$\dot x \dot+$ [$\dot y'$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]]] ; [[M Proposition 3.2(g) ≫ $\dot\forall\dot y$: [[$\dot x' \dot+$ [$\dot y$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]]] ; [[[M Proposition 3.2(h)$_{\text{(g)(ii)}}$ ▷ $\dot\forall\dot y$: [[$\dot x' \dot+$ [$\dot y$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]]] ≫ [[$\dot y' \dot+$ [$\dot x$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]]] ; [[S2′ ≫ [[[$\dot x \dot+$ [$\dot y$]] $\overset{\text{p}}{=}$ [$\dot y \dot+$ [$\dot x$]]] ⇒ [[$\dot x \dot+$ [$\dot y$]] ′ $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]]]] ; [[M Proposition 3.2(c) ≫ [[[$\dot x \dot+$ [$\dot y'$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]] ⇒ [[[$\dot x \dot+$ [$\dot y$]] ′ $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]] ⇒ [[$\dot x \dot+$ [$\dot y'$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]]]]] ; [[[M Tautology A ▷ [[[$\dot x \dot+$ [$\dot y'$]] $\overset{\text{p}}{=}$ [[$\dot x \dot+$ [$\dot y$]] ′]] ⇒ [[[$\dot x \dot+$ [$\dot y$]] ′ $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]] ⇒ [[$\dot x \dot+$ [$\dot y'$]] $\overset{\text{p}}{=}$ [[$\dot y \dot+$ [$\dot x$]] ′]]]]]]

$\gg [\,[\,[\dot{x}\dotplus[\dot{y}]\,]' \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{x}\dotplus[\dot{y}$
$]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,]\,]\,]\,]; [\,[\,[\,[$
$\text{M Tautology B} \rhd [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}]\,]' \stackrel{p}{=} [\,[$
$\dot{y}\dotplus[\dot{x}]\,]'\,]\,]\,]\,] \rhd [\,[\,[\dot{x}\dotplus[\dot{y}]\,]' \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{x}\dotplus[$
$\dot{y}']\,] \stackrel{p}{=} [\,[\dot{x}\dotplus[\dot{y}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,]\,]\,]\,]$
$\gg [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{x}\dotplus[\dot{y}]\,]'\,]$
$] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,]\,]\,]\,]; [\,[\,[\text{M Tautology A} \rhd [\,[$
$[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{x}\dotplus[\dot{y}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [$
$[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,]\,]\,]\,]\,] \gg [\,[\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{x}\dotplus[\dot{y}]$
$]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}$
$]\,]'\,]\,]\,]\,]\,]; [\,[\,[\,[\text{MP}' \rhd [\,[\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{x}\dotplus[\dot{y}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[$
$[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,]\,]\,]\,]\,]$
$\rhd [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{x}\dotplus[\dot{y}]\,]'\,]\,]\,] \gg [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]$
$] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,]\,]\,]; [\,[\text{M Proposition 3.2(d)} \gg [$
$[\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{y}'\dotplus[\dot{x}]\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'$
$]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\dot{y}'\dotplus[\dot{x}]\,]\,]\,]\,]\,]\,]; [\,[\,[\,[\text{M Tautology B} \rhd [\,[$
$[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,]\,]\,]\,] \rhd$
$[\,[\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{y}'\dotplus[\dot{x}]\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]$
$'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\dot{y}'\dotplus[\dot{x}]\,]\,]\,]\,]\,]\,]\,] \gg [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus$
$[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{y}'\dotplus[\dot{x}]\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [$
$\dot{y}'\dotplus[\dot{x}]\,]\,]\,]\,]\,]\,]; [\,[\,[\text{M Tautology A} \rhd [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]$
$] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{y}'\dotplus[\dot{x}]\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\dot{y}'\dotplus[\dot{x}]$
$]\,]\,]\,]\,] \gg [\,[\,[\dot{y}'\dotplus[\dot{x}]\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=}$
$[\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\dot{y}'\dotplus[\dot{x}]\,]\,]\,]\,]\,]; [\,[\,[\,[\text{MP}' \rhd [\,[$
$[\dot{y}'\dotplus[\dot{x}]\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}}$
$[\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\dot{y}'\dotplus[\dot{x}]\,]\,]\,]\,]\,]\,] \rhd [\,[\dot{y}'\dotplus[\dot{x}]\,] \stackrel{p}{=} [\,[\dot{y}\dotplus[\dot{x}]\,]'\,]$
$]\,] \gg [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\dot{y}'\dotplus[\dot{x}]\,]$
$]\,]\,]; [\,[\text{Gen}' \rhd [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [$
$\dot{y}'\dotplus[\dot{x}]\,]\,]\,]\,]\,] \gg \dot{\forall}\dot{y}\colon [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,]$
$\stackrel{p}{=} [\dot{y}'\dotplus[\dot{x}]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\,]\rceil, p_0, \mathsf{c})]$

[M Proposition 3.2(h)(ii) $\xrightarrow{\text{stmt}}$ $S' \vdash \dot{\forall}\dot{y}\colon [\,[\,[\dot{x}\dotplus[\dot{y}]\,] \stackrel{p}{=} [\dot{y}\dotplus[\dot{x}]\,]\,] \mathrel{\dot{\Rightarrow}} [\,[\dot{x}\dotplus[\dot{y}']\,] \stackrel{p}{=} [\dot{y}'\dotplus[\dot{x}]\,]\,]\,]\,]$]

[M Proposition 3.2(h)(ii) $\xrightarrow{\text{tex}}$ “M\ Proposition\ 3.2(h)(ii)”]

[M Proposition 3.2(h)(ii) $\xrightarrow{\text{pyk}}$ “mendelson proposition three two h ii”]

M Proposition 3.2(h)

[M Proposition 3.2(h) $\stackrel{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash [\ [\ S9' \gg [\ [\ \dot{\forall}\dot{x}\colon [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ \dot{y}' \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ] \dot{\Rightarrow} \dot{\forall}\dot{y}\colon [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [$ M Proposition 3.2(h)(i) $\gg \dot{\forall}\dot{x}\colon [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ \dot{\forall}\dot{x}\colon [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ \dot{y}' \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ] \dot{\Rightarrow} \dot{\forall}\dot{y}\colon [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ ] \rhd \dot{\forall}\dot{x}\colon [\ [\ \dot{x} \dot{+} \dot{0}\ ] \stackrel{p}{=} [\ \dot{0} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ] \gg [\ [\ \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ \dot{y}' \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ] \dot{\Rightarrow} \dot{\forall}\dot{y}\colon [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [$ M Proposition 3.2(h)(ii) $\gg \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ \dot{y}' \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ \dot{y}' \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ] \dot{\Rightarrow} \dot{\forall}\dot{y}\colon [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ] \rhd \dot{\forall}\dot{y}\colon [\ [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \dot{x} \dot{+} [\ \dot{y}'\ ]\ ] \stackrel{p}{=} [\ \dot{y}' \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ] \gg \dot{\forall}\dot{y}\colon [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ;\ [\ [\ Gen' \rhd \dot{\forall}\dot{y}\colon [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ] \gg \dot{\forall}\dot{x}\colon \dot{\forall}\dot{y}\colon [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\rceil, p_0, c)$]

[M Proposition 3.2(h) $\stackrel{\text{stmt}}{\to}$ $S' \vdash \dot{\forall}\dot{x}\colon \dot{\forall}\dot{y}\colon [\ [\ \dot{x} \dot{+} [\ \dot{y}\ ]\ ] \stackrel{p}{=} [\ \dot{y} \dot{+} [\ \dot{x}\ ]\ ]\ ]\ ]$]

[M Proposition 3.2(h) $\stackrel{\text{tex}}{\to}$ "M\ Proposition\ 3.2(h)"]

[M Proposition 3.2(h) $\stackrel{\text{pyk}}{\to}$ "mendelson proposition three two h"]

M Tautology A

[M Tautology A $\stackrel{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\lceil 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 [\ [\ A2' \gg [\ [\ \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}\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ \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}\ ]\ ]\ ]\ ] \rhd [\ \underline{a} \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ] \gg [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ;\ [\ [\ A1' \gg [\ [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ] \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ] \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ]\ ] \rhd [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ] \gg [\ \underline{b} \dot{\Rightarrow} [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ]\ ;\ [\ [\ A2' \gg [\ [\ \underline{b} \dot{\Rightarrow} [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ]\ ] \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ \underline{b} \dot{\Rightarrow} [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ] \dot{\Rightarrow} [\ [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ]\ ] \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ]\ ] \rhd [\ \underline{b} \dot{\Rightarrow} [\ [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ] \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ] \gg [\ [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ]\ ] \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ]\ ;\ [\ [\ A1' \gg [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ]\ ]\ ]\ ;\ [\ [\ [\ MP' \rhd [\ [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ]\ ] \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ] \rhd [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{b}\ ]\ ]\ ] \gg [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\rceil, p_0, c)$]

[M Tautology A $\stackrel{\text{stmt}}{\to}$ $S' \vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon [\ [\ \underline{a} \dot{\Rightarrow} [\ \underline{b} \dot{\Rightarrow} \underline{c}\ ]\ ]\ \vdash [\ \underline{b} \dot{\Rightarrow} [\ \underline{a} \dot{\Rightarrow} \underline{c}\ ]\ ]\ ]$]

[M Tautology A $\overset{\text{tex}}{\to}$ “M\ Tautology\ A”]

[M Tautology A $\overset{\text{pyk}}{\to}$ “mendelson tautology a”]

M Tautology B

[M Tautology B $\overset{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\lceil S' \vdash \forall \underline{d}\colon \forall \underline{e}\colon \forall \underline{f}\colon\ [\ [\ \underline{d} \Rightarrow \underline{e}\ ] \vdash [\ [\ \underline{e} \Rightarrow \underline{f}\ ] \vdash [\ [\ A1' \gg [\ [\ \underline{e} \Rightarrow \underline{f}\ ] \Rightarrow [\ [\ \underline{d} \Rightarrow [\ \underline{e} \Rightarrow \underline{f}\ ]\ ]\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ \underline{e} \Rightarrow \underline{f}\ ] \Rightarrow [\ \underline{d} \Rightarrow [\ \underline{e} \Rightarrow \underline{f}\ ]\ ]\ ]\ ]\ ]\ \rhd [\ \underline{e} \Rightarrow \underline{f}\ ]\ ] \gg [\ \underline{d} \Rightarrow [\ \underline{e} \Rightarrow \underline{f}\ ]\ ]\ ]\ ;\ [\ [\ A2' \gg [\ [\ \underline{d} \Rightarrow [\ \underline{e} \Rightarrow \underline{f}\ ]\ ] \Rightarrow [\ [\ \underline{d} \Rightarrow \underline{e}\ ] \Rightarrow [\ \underline{d} \Rightarrow \underline{f}\ ]\ ]\ ]\ ;\ [\ [\ [\ [\ MP' \rhd [\ [\ \underline{d} \Rightarrow [\ \underline{e} \Rightarrow \underline{f}\ ]\ ] \Rightarrow [\ [\ \underline{d} \Rightarrow \underline{e}\ ] \Rightarrow [\ \underline{d} \Rightarrow \underline{f}\ ]\ ]\ ]\ ]\ \rhd [\ \underline{d} \Rightarrow [\ \underline{e} \Rightarrow \underline{f}\ ]\ ]\ ]\ ] \gg [\ [\ \underline{d} \Rightarrow \underline{e}\ ] \Rightarrow [\ \underline{d} \Rightarrow \underline{f}\ ]\ ]\ ]\ ;\ [\ [\ [\ MP' \rhd [\ [\ \underline{d} \Rightarrow \underline{e}\ ] \Rightarrow [\ \underline{d} \Rightarrow \underline{f}\ ]\ ]\ ]\ \rhd [\ \underline{d} \Rightarrow \underline{e}\ ]\ ] \gg [\ \underline{d} \Rightarrow \underline{f}\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\ ]\rfloor, p_0, c)$]

[M Tautology B $\overset{\text{stmt}}{\to}$ $S' \vdash \forall \underline{d}\colon \forall \underline{e}\colon \forall \underline{f}\colon\ [\ [\ \underline{d} \Rightarrow \underline{e}\ ] \vdash [\ [\ \underline{e} \Rightarrow \underline{f}\ ] \vdash [\ \underline{d} \Rightarrow \underline{f}\ ]\ ]\ ]$]

[M Tautology B $\overset{\text{tex}}{\to}$ “M\ Tautology\ B”]

[M Tautology B $\overset{\text{pyk}}{\to}$ “mendelson tautology b”]

The pyk compiler, version 0.grue.20050603 by Klaus Grue
GRD-2005-07-03.UTC:14:50:38.354331 = MJD-53554.TAI:14:51:10.354331 = LGT-4627119070354331e-6