Logiweb codex of peano

Up Help

peano, intro(∗, ∗, ∗, ∗), intro(∗, ∗, ∗), $\dot{0}$, $\dot{1}$, $\dot{2}$, $\dot{a}$, $\dot{b}$, $\dot{c}$, $\dot{d}$, $\dot{e}$, $\dot{f}$, $\dot{g}$, $\dot{h}$, $\dot{i}$, $\dot{j}$, $\dot{k}$, $\dot{l}$, $\dot{m}$, $\dot{n}$, $\dot{o}$, $\dot{p}$, $\dot{q}$, $\dot{r}$, $\dot{s}$, $\dot{t}$, $\dot{u}$, $\dot{v}$, $\dot{w}$, $\dot{x}$, $\dot{y}$, $\dot{z}$, nonfree(∗, ∗), nonfree*(∗, ∗), free⟨∗|∗ := ∗⟩, free*⟨∗|∗ := ∗⟩, ∗≡⟨∗|∗ := ∗⟩, ∗≡⟨*∗|∗ := ∗⟩, S, A1, A2, A3, A4, A5, S1, S2, S3, S4, S5, S6, S7, S8, S9, MP, Gen, L3.2(a), $\dot{*}$, $*'$, $*\dot{:}*$, $*\dot{+}*$, $*\stackrel{\mathrm{p}}{=}*$, $*^{\mathcal{P}}$, $\dot{\neg}*$, $*\dot{\wedge}*$, $*\dot{\vee}*$, $\dot{\forall}*:*$, $\dot{\exists}*:*$, $*\dot{\Rightarrow}*$, $*\dot{\Leftrightarrow}*$,

peano

[peano $\stackrel{\mathrm{prio}}{\rightarrow}$
Preassociative
[peano], [base], [bracket ∗ end bracket], [big bracket ∗ end bracket], [math ∗ end math], [**flush left** [∗]], [x], [y], [z], [[∗ ⋈ ∗]], [[∗ $\stackrel{*}{\rightarrow}$ ∗]], [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], [⟨∗ | ∗ := ∗⟩], [$\mathcal{M}$(∗)], [$\mathcal{U}$(∗)], [$\mathcal{U}$(∗)], [$\mathcal{U}^{\mathrm{M}}$(∗)], [**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**(∗, ∗, ∗, ∗)], [⌈∗⌉], [$\mathcal{M}$(∗, ∗, ∗)], [$\mathcal{M}_2$(∗, ∗, ∗, ∗)], [$\mathcal{M}^{*}$(∗, ∗, ∗)], [macro], [s_0], [**zip**(∗, ∗)], [**assoc**$_1$(∗, ∗, ∗)], [(∗)$^{\mathrm{p}}$], [self], [[∗ $\ddot{=}$ ∗]], [[∗ $\dot{=}$ ∗]], [[∗ $\acute{=}$ ∗]], [[∗ $\stackrel{\mathrm{pyk}}{=}$ ∗]], [[∗ $\stackrel{\mathrm{tex}}{=}$ ∗]], [[∗ $\stackrel{\mathrm{name}}{=}$ ∗]], [**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**(∗, ∗, ∗)], [⟨∗⟩], [**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′$_{\mathrm{E}}$], [L$_1$], [∗], [$\mathcal{A}$], [$\mathcal{B}$], [$\mathcal{C}$], [$\mathcal{D}$], [$\mathcal{E}$], [$\mathcal{F}$], [$\mathcal{G}$], [$\mathcal{H}$], [$\mathcal{I}$], [$\mathcal{J}$], [$\mathcal{K}$], [$\mathcal{L}$], [$\mathcal{M}$], [$\mathcal{N}$], [$\mathcal{O}$], [$\mathcal{P}$], [$\mathcal{Q}$], [$\mathcal{R}$], [$\mathcal{S}$], [$\mathcal{T}$], [$\mathcal{U}$], [$\mathcal{V}$], [$\mathcal{W}$], [$\mathcal{X}$], [$\mathcal{Y}$], [$\mathcal{Z}$], [⟨∗ | ∗ := ∗⟩], [⟨*∗ | ∗ := ∗⟩], [∅], [Remainder], [(∗)$^{\mathbf{v}}$], [error(∗, ∗)], [error$_2$(∗, ∗)], [proof(∗, ∗, ∗)], [proof$_2$(∗, ∗)], [$\mathcal{S}$(∗, ∗)], [$\mathcal{S}^{\mathrm{I}}$(∗, ∗)], [$\mathcal{S}^{\triangleright}$(∗, ∗)], [$\mathcal{S}^{\triangleright}_1$(∗, ∗, ∗)], [$\mathcal{S}^{\mathrm{E}}$(∗, ∗)], [$\mathcal{S}^{\mathrm{E}}_1$(∗, ∗, ∗)], [$\mathcal{S}^{+}$(∗, ∗)], [$\mathcal{S}^{+}_1$(∗, ∗, ∗)],

$[\mathcal{S}^{-}(*,*)]$, $[\mathcal{S}_1^{-}(*,*,*)]$, $[\mathcal{S}^{*}(*,*)]$, $[\mathcal{S}_1^{*}(*,*,*)]$, $[\mathcal{S}_2^{*}(*,*,*,*)]$, $[\mathcal{S}^{@}(*,*)]$, $[\mathcal{S}_1^{@}(*,*,*)]$, $[\mathcal{S}^{\vdash}(*,*)]$, $[\mathcal{S}_1^{\vdash}(*,*,*,*)]$, $[\mathcal{S}^{\Vdash}(*,*)]$, $[\mathcal{S}_1^{\Vdash}(*,*,*,*)]$, $[\mathcal{S}^{\mathrm{i.e.}\cdot}(*,*)]$, $[\mathcal{S}_1^{\mathrm{i.e.}\cdot}(*,*,*,*)]$, $[\mathcal{S}_2^{\mathrm{i.e.}\cdot}(*,*,*,*,*)]$, $[\mathcal{S}^{\forall}(*,*)]$, $[\mathcal{S}_1^{\forall}(*,*,*,*)]$, $[\mathcal{S}^{;}(*,*)]$, $[\mathcal{S}_1^{;}(*,*,*)]$, $[\mathcal{S}_2^{;}(*,*,*,*)]$, $[\mathcal{T}(*)]$, [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$_{\mathrm{E}}$], [ragged right], [ragged right expansion], [parm$(*,*,*)$], [parm$^{*}(*,*,*)$], [inst$(*,*,*)$], [inst$^{*}(*,*,*)$], [occur$(*,*,*)$], [occur$^{*}(*,*,*)$], [unify$(*=*,*)$], [unify$^{*}(*=*,*)$], [unify$_2(*=*,*)$], [L$_{\mathrm{a}}$], [L$_{\mathrm{b}}$], [L$_{\mathrm{c}}$], [L$_{\mathrm{d}}$], [L$_{\mathrm{e}}$], [L$_{\mathrm{f}}$], [L$_{\mathrm{g}}$], [L$_{\mathrm{h}}$], [L$_{\mathrm{i}}$], [L$_{\mathrm{j}}$], [L$_{\mathrm{k}}$], [L$_{\mathrm{l}}$], [L$_{\mathrm{m}}$], [L$_{\mathrm{n}}$], [L$_{\mathrm{o}}$], [L$_{\mathrm{p}}$], [L$_{\mathrm{q}}$], [L$_{\mathrm{r}}$], [L$_{\mathrm{s}}$], [L$_{\mathrm{t}}$], [L$_{\mathrm{u}}$], [L$_{\mathrm{v}}$], [L$_{\mathrm{w}}$], [L$_{\mathrm{x}}$], [L$_{\mathrm{y}}$], [L$_{\mathrm{z}}$], [L$_{\mathrm{A}}$], [L$_{\mathrm{B}}$], [L$_{\mathrm{C}}$], [L$_{\mathrm{D}}$], [L$_{\mathrm{E}}$], [L$_{\mathrm{F}}$], [L$_{\mathrm{G}}$], [L$_{\mathrm{H}}$], [L$_{\mathrm{I}}$], [L$_{\mathrm{J}}$], [L$_{\mathrm{K}}$], [L$_{\mathrm{L}}$], [L$_{\mathrm{M}}$], [L$_{\mathrm{N}}$], [L$_{\mathrm{O}}$], [L$_{\mathrm{P}}$], [L$_{\mathrm{Q}}$], [L$_{\mathrm{R}}$], [L$_{\mathrm{S}}$], [L$_{\mathrm{T}}$], [L$_{\mathrm{U}}$], [L$_{\mathrm{V}}$], [L$_{\mathrm{W}}$], [L$_{\mathrm{X}}$], [L$_{\mathrm{Y}}$], [L$_{\mathrm{Z}}$], [L$_{?}$], [Reflexivity], [Reflexivity$_1$], [Commutativity], [Commutativity$_1$], [<tactic>], [tactic], $[[* \overset{\text{tactic}}{=} *]]$, $[\mathcal{P}(*,*,*)]$, $[\mathcal{P}^{*}(*,*,*)]$, [p$_0$], [conclude$_1(*,*)$], [conclude$_2(*,*,*)$], [conclude$_3(*,*,*,*)$], [intro$(*,*,*,*)$], [intro$(*,*,*)$], $[\dot{0}]$, $[\dot{1}]$, $[\dot{2}]$, $[\dot{a}]$, $[\dot{b}]$, $[\dot{c}]$, $[\dot{d}]$, $[\dot{e}]$, $[\dot{f}]$, $[\dot{g}]$, $[\dot{h}]$, $[\dot{i}]$, $[\dot{j}]$, $[\dot{k}]$, $[\dot{l}]$, $[\dot{m}]$, $[\dot{n}]$, $[\dot{o}]$, $[\dot{p}]$, $[\dot{q}]$, $[\dot{r}]$, $[\dot{s}]$, $[\dot{t}]$, $[\dot{u}]$, $[\dot{v}]$, $[\dot{w}]$, $[\dot{x}]$, $[\dot{y}]$, $[\dot{z}]$, [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)];

Preassociative

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

Preassociative

[“ $*$ ”], [], [$(*)^{\mathbf{t}}$], [string$(*)+*$], [string$(*)$ ++ $*$], [$*$], [$*$], [!$*$], [”$*$], [#$*$], [\$$*$], [%$*$], [&$*$], [’$*$], [($*$], [)$*$], [$**$], [+$*$], [,$*$], [-$*$], [.$*$], [/$*$], [0$*$], [1$*$], [2$*$], [3$*$], [4$*$], [5$*$], [6$*$], [7$*$], [8$*$], [9$*$], [:$*$], [;$*$], [<$*$], [=$*$], [>$*$], [?$*$], [@$*$], [A$*$], [B$*$], [C$*$], [D$*$], [E$*$], [F$*$], [G$*$], [H$*$], [I$*$], [J$*$], [K$*$], [L$*$], [M$*$], [N$*$], [O$*$], [P$*$], [Q$*$], [R$*$], [S$*$], [T$*$], [U$*$], [V$*$], [W$*$], [X$*$], [Y$*$], [Z$*$], [[$*$], [\$*$], []$*$], [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

[$*\cdot*$], [$*\cdot_0*$], [$*\vdots*$];

Preassociative
$[* + *], [* +_0 *], [* +_1 *], [* - *], [* -_0 *], [* -_1 *], [* \dot{+} *];$
Preassociative
$[* \cup \{*\}], [* \cup *], [* \backslash \{*\}];$
Postassociative
$[* \therefore *], [* \dot{\therefore} *], [* :: *], [* \underline{+2*} *], [* :: *], [* +2* *];$
Postassociative
$[*, *];$
Preassociative
$[* \overset{\mathrm{B}}{\approx} *], [* \overset{\mathrm{D}}{\approx} *], [* \overset{\mathrm{C}}{\approx} *], [* \overset{\mathrm{P}}{\approx} *], [* \approx *], [* = *], [* \overset{+}{\to} *], [* \overset{\mathrm{t}}{=} *], [* \overset{\mathrm{t}^*}{=} *], [* \overset{\mathrm{r}}{=} *],$
$[* \in_{\mathrm{t}} *], [* \subseteq_{\mathrm{T}} *], [* \overset{\mathrm{T}}{=} *], [* \overset{\mathrm{s}}{=} *], [* \text{ free in } *], [* \text{ free in}^* *], [* \text{ free for } * \text{ in } *],$
$[* \text{ free for}^* * \text{ in } *], [* \in_{\mathrm{c}} *], [* < *], [* <' *], [* \leq' *], [* \overset{\mathrm{p}}{=} *], [*^{\mathcal{P}}];$
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
$[* \ddot{\Rightarrow} *], [* \dot{\Rightarrow} *], [* \Leftrightarrow *];$
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
$[*^{\mathrm{I}}], [*^{\triangleright}], [*^{\mathrm{V}}], [*^{+}], [*^{-}], [*^{*}];$
Preassociative
$[* @ *], [* \triangleright *], [* \Rrightarrow *], [* \gg *];$
Postassociative
$[* \vdash *], [* \Vdash *], [* \text{ i.e. } *];$
Preassociative
$[\dot{\forall} *: *];$
Postassociative
$[* \oplus *];$
Postassociative
$[*; *];$
Preassociative
$[* \text{ proves } *];$
Preassociative
$[* \textbf{ proof of } * : *], [\text{Line} * : * \gg *; *], [\text{Last line} * \gg * \Box],$

[Line $*$: Premise $\gg *; *$], [Line $*$: Side-condition $\gg *; *$], [Arbitrary $\gg *; *$], [Local $\gg * = *; *$];
Postassociative
[$*$ then $*$], [$*[\ *\ ]*$];
Preassociative
[$*\&*$];
Preassociative
[$*\backslash\backslash *$];]

[peano $\overset{\text{pyk}}{\to}$ "peano"]

intro$(*, *, *, *)$

[intro$(\mathsf{x}, \mathsf{i}, \mathsf{p}, \mathsf{t})$ $\overset{\text{name}}{\to}$ "
intro(#1.
, #2.
, #3.
, #4.
)"]

[intro$(\mathsf{x}, \mathsf{i}, \mathsf{p}, \mathsf{t})$ $\overset{\text{macro}}{\to}$ $\lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\text{intro}(\mathsf{x}, \mathsf{i}, \mathsf{p}, \mathsf{t}) \ddot{=} [\mathsf{x} \overset{\text{pyk}}{=} \mathsf{p}][\mathsf{x} \overset{\text{tex}}{=} \mathsf{t}]]\rceil)$]

[intro$(\mathsf{x}, \mathsf{i}, \mathsf{p}, \mathsf{t})$ $\overset{\text{tex}}{\to}$ "\index{#2.: #3. @#2.: $[#1/tex name/tex.]$ #3.}%
\index{#3. $[#1/tex name/tex.]$}%
\tex{
$[#1/tex name/tex.
\stackrel {\mathrm {tex}}{=} #4/tex name.
]$}$[#1/tex name/tex.%
]$\footnote{$[#1/tex name/tex.
\stackrel {\mathrm {pyk}}{=} #3/tex name.
]$}"]

[intro$(\mathsf{x}, \mathsf{i}, \mathsf{p}, \mathsf{t})$ $\overset{\text{pyk}}{\to}$ "intro $*$ index $*$ pyk $*$ tex $*$ end intro"]

intro$(*, *, *)$

[intro$(\mathsf{x}, \mathsf{p}, \mathsf{t})$ $\overset{\text{name}}{\to}$ "
intro(#1.
, #2.
, #3.
)"]

[intro$(\mathsf{x}, \mathsf{p}, \mathsf{t})$ $\overset{\text{macro}}{\to}$ $\lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\text{intro}(\mathsf{x}, \mathsf{p}, \mathsf{t}) \ddot{=} [\mathsf{x} \overset{\text{pyk}}{=} \mathsf{p}][\mathsf{x} \overset{\text{tex}}{=} \mathsf{t}]]\rceil)$]

[intro$(\mathsf{x}, \mathsf{p}, \mathsf{t})$ $\overset{\text{tex}}{\to}$ "\index{\alpha #2. @\back \makebox[20mm][l]{$[#1/tex

name/tex.]$}#2.}%
\index{#2. $[#1/tex name/tex.]$}%
\tex{
$[#1/tex name/tex.
\stackrel {\mathrm {tex}}{=} #3/tex name.
]$}$[#1/tex name/tex.%
]$\footnote{$[#1/tex name/tex.
\stackrel {\mathrm {pyk}}{=} #2/tex name.
]$}"]

$[\mathrm{intro}(\mathsf{x}, \mathsf{p}, \mathsf{t}) \overset{\mathrm{pyk}}{\to} \text{“intro} * \text{pyk} * \text{tex} * \text{end intro”}]$

$\dot{0}$

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

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

$\dot{1}$

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

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

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

$\dot{2}$

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

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

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

$\dot{a}$

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

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

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

$\dot{b}$

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

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

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

$\dot{c}$

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

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

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

$\dot{d}$

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

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

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

$\dot{e}$

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

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

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

$\dot{f}$

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

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

$\dot{g}$

$[\dot{g} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{g} \doteqdot \dot{\mathsf{g}}]\urcorner)]$
$[\dot{g} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{g}\}\}\text{”}]$
$[\dot{g} \overset{\text{pyk}}{\to} \text{“peano g”}]$

$\dot{h}$

$[\dot{h} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{h} \doteqdot \dot{\mathsf{h}}]\urcorner)]$
$[\dot{h} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{h}\}\}\text{”}]$
$[\dot{h} \overset{\text{pyk}}{\to} \text{“peano h”}]$

$\dot{\imath}$

$[\dot{\imath} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{\imath} \doteqdot \dot{\mathsf{i}}]\urcorner)]$
$[\dot{\imath} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{i}\}\}\text{”}]$
$[\dot{\imath} \overset{\text{pyk}}{\to} \text{“peano i”}]$

$\dot{\jmath}$

$[\dot{\jmath} \overset{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\ulcorner[\dot{\jmath} \doteqdot \dot{\mathsf{j}}]\urcorner)]$
$[\dot{\jmath} \overset{\text{tex}}{\to} \text{“}$
$\backslash\text{dot}\{\backslash\text{mathit}\{\text{j}\}\}\text{”}]$
$[\dot{\jmath} \overset{\text{pyk}}{\to} \text{“peano j”}]$

$\dot{k}$

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

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

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

$\dot{l}$

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

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

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

$\dot{m}$

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

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

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

$\dot{n}$

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

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

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

$\dot{o}$

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

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

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

$\dot{p}$

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

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

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

$\dot{q}$

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

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

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

$\dot{r}$

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

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

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

$\dot{s}$

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

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

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

$\dot{t}$

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

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

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

$\dot{u}$

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

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

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

$\dot{v}$

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

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

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

$\dot{w}$

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

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

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

$\dot{x}$

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

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

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

$\dot{y}$

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

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

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

$\dot{z}$

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

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

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

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

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

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

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

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

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

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

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

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

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

$\mathsf{If}(\dot{\neg}\mathsf{nonfree}(\mathsf{a}^1,\mathsf{b}),\mathsf{F},$
$\mathsf{free}\langle\mathsf{a}^2|\mathsf{x}:=\mathsf{b}\rangle))))))\ ]\ ]$

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

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

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

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

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

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

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

$[\mathsf{a}\equiv\langle\mathsf{b}|\mathsf{x}:=\mathsf{c}\rangle \overset{\text{pyk}}{\to}$ “peano sub ∗ is ∗ where ∗ is ∗ end sub”]

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

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

$[\mathsf{a}\equiv\langle{}^*\mathsf{b}|\mathsf{x}:=\mathsf{c}\rangle \overset{\text{tex}}{\to}$ “#1.

{\equiv}\langle^* #2.
|#3.
:=#4.
\rangle”]

[a≡⟨*b|x := c⟩ $\overset{\text{pyk}}{\to}$ “peano sub star ∗ is ∗ where ∗ is ∗ end sub”]

S

[S $\overset{\text{stmt}}{\to}$ [[$\dot{a}'$ $\overset{\text{p}}{=}$ [$\dot{b}'$]] $\dot{\Rightarrow}$ [$\dot{a}$ $\overset{\text{p}}{=}$ [$\dot{b}$]]] $\oplus$ [[$\forall \underline{a}$: $\forall \underline{b}$: [$\underline{a}$ $\dot{\Rightarrow}$ [$\underline{b}$ $\dot{\Rightarrow}$ $\underline{a}$]]] $\oplus$ [[$\forall \underline{x}$: $\forall \underline{a}$: $\forall \underline{b}$: [nonfree($\underline{x}$, $\underline{a}$) $\dot{\vdash}$ [[$\forall \underline{x}$: [$\underline{a}$ $\dot{\Rightarrow}$ $\underline{b}$]] $\dot{\Rightarrow}$ [$\underline{a}$ $\dot{\Rightarrow}$ $\forall \underline{x}$: $\underline{b}$]]]] $\oplus$ [[[$\dot{a}$: [$\dot{b}'$]] $\overset{\text{p}}{=}$ [[$\dot{a}$: [$\dot{b}$]] $\dot{+}$ [$\dot{a}$]]] $\oplus$ [[[$\dot{a}$ $\overset{\text{p}}{=}$ [$\dot{b}$]] $\dot{\Rightarrow}$ [$\dot{a}'$ $\overset{\text{p}}{=}$ [$\dot{b}'$]]]] $\oplus$ [[$\forall \underline{a}$: $\forall \underline{b}$: [[$\underline{a}$ $\dot{\Rightarrow}$ $\underline{b}$] $\vdash$ [$\underline{a}$ $\vdash$ $\underline{b}$]]] $\oplus$ [[[[$\dot{\neg}$ $\underline{b}$] $\dot{\Rightarrow}$ $\dot{\neg}$ $\underline{a}$] $\dot{\Rightarrow}$ [[[$\dot{\neg}$ $\underline{b}$] $\dot{\Rightarrow}$ $\underline{a}$] $\dot{\Rightarrow}$ $\underline{b}$]] $\oplus$ [[[$\dot{a}$ $\dot{+}$ [$\dot{b}'$]] $\overset{\text{p}}{=}$ [[$\dot{a}$ $\dot{+}$ [$\dot{b}$]] $'$]] $\oplus$ [[$\neg$ [$\dot{0}$ $\overset{\text{p}}{=}$ [$\dot{a}'$]]] $\oplus$ [[$\forall \underline{x}$: $\forall \underline{a}$: [$\underline{a}$ $\vdash$ $\forall \underline{x}$: $\underline{a}$]] $\oplus$ [[$\forall \underline{c}$: $\forall \underline{x}$: $\forall \underline{b}$: $\forall \underline{a}$: [$\underline{a}$≡⟨$\underline{b}$|$\underline{x}$:= $\underline{c}$⟩ $\dot{\vdash}$ [[$\forall \underline{x}$: $\underline{b}$] $\dot{\Rightarrow}$ $\underline{a}$]]] $\oplus$ [[[$\dot{a}$: $\dot{0}$] $\overset{\text{p}}{=}$ $\dot{0}$] $\oplus$ [[[$\dot{a}$ $\overset{\text{p}}{=}$ [$\dot{b}$]] $\dot{\Rightarrow}$ [[$\dot{a}$ $\overset{\text{p}}{=}$ [$\dot{c}$]] $\dot{\Rightarrow}$ [$\dot{b}$ $\overset{\text{p}}{=}$ [$\dot{c}$]]]] $\oplus$ [[$\forall \underline{a}$: $\forall \underline{b}$: $\forall \underline{c}$: $\forall \underline{x}$: [$\underline{b}$≡⟨$\underline{a}$|$\underline{x}$:= $\dot{0}$⟩ $\dot{\vdash}$ [$\underline{c}$≡⟨$\underline{a}$|$\underline{x}$:= $\underline{x}'$⟩ $\dot{\vdash}$ [$\underline{b}$ $\dot{\Rightarrow}$ [[$\forall \underline{x}$: [$\underline{a}$ $\dot{\Rightarrow}$ $\underline{c}$]] $\dot{\Rightarrow}$ $\forall \underline{x}$: $\underline{a}$]]]]] $\oplus$ [[$\forall \underline{a}$: $\forall \underline{b}$: $\forall \underline{c}$: [[$\underline{a}$ $\dot{\Rightarrow}$ [$\underline{b}$ $\dot{\Rightarrow}$ $\underline{c}$]] $\dot{\Rightarrow}$ [[$\underline{a}$ $\dot{\Rightarrow}$ $\underline{b}$] $\dot{\Rightarrow}$ [$\underline{a}$ $\dot{\Rightarrow}$ $\underline{c}$]]]] $\oplus$ [[$\dot{a}$ $\dot{+}$ $\dot{0}$] $\overset{\text{p}}{=}$ [$\dot{a}$]]]]]]]]]]]]]]]]]]]

[S $\overset{\text{tex}}{\to}$ “
S”]

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

A1

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

[A1 $\overset{\text{stmt}}{\to}$ S $\vdash$ $\forall \underline{a}$: $\forall \underline{b}$: [$\underline{a}$ $\dot{\Rightarrow}$ [$\underline{b}$ $\dot{\Rightarrow}$ $\underline{a}$]]]

[A1 $\overset{\text{tex}}{\to}$ “
A1”]

[A1 $\overset{\text{pyk}}{\to}$ “axiom a one”]

A2

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

[A2 $\overset{\text{stmt}}{\to}$ S $\vdash$ $\forall \underline{a}$: $\forall \underline{b}$: $\forall \underline{c}$: [[$\underline{a}$ $\dot{\Rightarrow}$ [$\underline{b}$ $\dot{\Rightarrow}$ $\underline{c}$]] $\dot{\Rightarrow}$ [[$\underline{a}$ $\dot{\Rightarrow}$ $\underline{b}$] $\dot{\Rightarrow}$ [$\underline{a}$ $\dot{\Rightarrow}$ $\underline{c}$]]]]

[A2 $\overset{\text{tex}}{\to}$ “

A2”]

[A2 $\overset{\text{pyk}}{\to}$ “axiom a two”]

A3

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

[A3 $\overset{\text{stmt}}{\to}$ S $\vdash$ [[[$\dot{\neg}$ b] $\dot{\Rightarrow}$ $\dot{\neg}$ a] $\dot{\Rightarrow}$ [[[$\dot{\neg}$ b] $\dot{\Rightarrow}$ a] $\dot{\Rightarrow}$ b]]]

[A3 $\overset{\text{tex}}{\to}$ “
A3”]

[A3 $\overset{\text{pyk}}{\to}$ “axiom a three”]

A4

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

[A4 $\overset{\text{stmt}}{\to}$ S $\vdash$ $\forall$c: $\forall$x: $\forall$b: $\forall$a: [a$\equiv\langle$b|x := c$\rangle$ $\Vdash$ [[$\dot{\forall}$x: b] $\dot{\Rightarrow}$ a]]]

[A4 $\overset{\text{tex}}{\to}$ “
A4”]

[A4 $\overset{\text{pyk}}{\to}$ “axiom a four”]

A5

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

[A5 $\overset{\text{stmt}}{\to}$ S $\vdash$ $\forall$x: $\forall$a: $\forall$b: [$\dot{\text{nonfree}}$(x, a) $\Vdash$ [[$\dot{\forall}$x: [a $\dot{\Rightarrow}$ b]] $\dot{\Rightarrow}$ [a $\dot{\Rightarrow}$ $\dot{\forall}$x: b]]]]

[A5 $\overset{\text{tex}}{\to}$ “
A5”]

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

S1

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

[S1 $\overset{\text{stmt}}{\to}$ S $\vdash$ [[ȧ $\overset{\text{p}}{=}$ [ḃ]] $\dot{\Rightarrow}$ [[ȧ $\overset{\text{p}}{=}$ [ċ]] $\dot{\Rightarrow}$ [ḃ $\overset{\text{p}}{=}$ [ċ]]]]]

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

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

S2

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

[S2 $\overset{\text{stmt}}{\to}$ $\mathrm{S} \vdash [\ [\ \dot{\mathsf{a}} \overset{\mathrm{p}}{=} [\ \dot{\mathsf{b}}\ ]\ ] \Rightarrow [\ \dot{\mathsf{a}}' \overset{\mathrm{p}}{=} [\ \dot{\mathsf{b}}'\ ]\ ]\ ]$]

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

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

S3

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

[S3 $\overset{\text{stmt}}{\to}$ $\mathrm{S} \vdash \neg [\ \dot{0} \overset{\mathrm{p}}{=} [\ \dot{\mathsf{a}}'\ ]\ ]$]

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

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

S4

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

[S4 $\overset{\text{stmt}}{\to}$ $\mathrm{S} \vdash [\ [\ \dot{\mathsf{a}}' \overset{\mathrm{p}}{=} [\ \dot{\mathsf{b}}'\ ]\ ] \Rightarrow [\ \dot{\mathsf{a}} \overset{\mathrm{p}}{=} [\ \dot{\mathsf{b}}\ ]\ ]\ ]$]

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

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

S5

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

[S5 $\overset{\text{stmt}}{\to}$ $\mathrm{S} \vdash [\ [\ \dot{\mathsf{a}} \dot{+} \dot{0}\ ] \overset{\mathrm{p}}{=} [\ \dot{\mathsf{a}}\ ]\ ]$]

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

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

S6

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

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

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

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

S7

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

[S7 $\overset{\text{stmt}}{\to}$ $\mathsf{S} \vdash [\ [\ \dot{\mathsf{a}} \dot{:} \dot{0}\ ] \overset{\text{p}}{=} \dot{0}\ ]$]

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

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

S8

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

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

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

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

S9

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

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

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

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

MP

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

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

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

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

Gen

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

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

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

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

L3.2(a)

[L3.2(a) $\overset{\text{proof}}{\to}$ $\lambda \mathsf{c}.\lambda \mathsf{x}.\mathcal{P}(\lceil \mathsf{S} \vdash [\; [\; \mathsf{S5} \gg [\; [\; \dot{\mathsf{a}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{a}} \;] \;] \;] ; [\; [\; [\; \mathsf{Gen} \rhd [\; [\; \dot{\mathsf{a}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{a}} \;] \;] \;] \gg \dot{\forall} \dot{\mathsf{a}}\colon [\; [\; \dot{\mathsf{a}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{a}} \;] \;] \;] ; [\; [\; [\; [\; [\; [\; \mathsf{A4} @ [\; \dot{\mathsf{x}} \;] \;] @ [\; \dot{\mathsf{a}} \;] \;] @ [\; [\; \dot{\mathsf{a}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{a}} \;] \;] \;] @ [\; [\; \dot{\mathsf{x}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{x}} \;] \;] \;] \gg [\; [\; \dot{\forall} \dot{\mathsf{a}}\colon [\; [\; \dot{\mathsf{a}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{a}} \;] \;] \;] \Rightarrow [\; [\; \dot{\mathsf{x}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{x}} \;] \;] \;] \;] ; [\; [\; [\; \mathsf{MP} \rhd [\; [\; \dot{\forall} \dot{\mathsf{a}}\colon [\; [\; \dot{\mathsf{a}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{a}} \;] \;] \;] \Rightarrow [\; [\; \dot{\mathsf{x}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{x}} \;] \;] \;] \;] \rhd \dot{\forall} \dot{\mathsf{a}}\colon [\; [\; \dot{\mathsf{a}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{a}} \;] \;] \;] \gg [\; [\; \dot{\mathsf{x}} \dot{+} \dot{0} \;] \overset{\mathsf{p}}{=} [\; \dot{\mathsf{x}} \;] \;] \;] \;] \;] \rceil, \mathsf{p}_0, \mathsf{c})$]

[L3.2(a) $\overset{\text{stmt}}{\to}$ $\mathsf{S} \vdash [\; \dot{\mathsf{x}} \overset{\mathsf{p}}{=} [\; \dot{\mathsf{x}} \;] \;]$]

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

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

$\dot{*}$

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

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

$*'$

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

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

$* \dot{:} *$

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

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

$* \dot{+} *$

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

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

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

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

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

$*^{\mathcal{P}}$

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

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

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

$\dot{\neg}\, *$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The pyk compiler, version 0.grue.20050502+ by Klaus Grue
GRD-2005-06-02.UTC:10:16:52.703168 = MJD-53523.TAI:10:17:24.703168 =
LGT-4624424244703168e-6