Logiweb codex of kvanti

Up Help

$\exists *\colon *$, $* \Rightarrow *$, kvanti, UniqueMember, UniqueMember(Type), SameSeries, A4, SameMember, Qclosed(Addition), Qclosed(Multiplication), FromCartProd(1), 1rule fromCartProd(2), constantRationalSeries($*$), cartProd($*$), Power($*$), binaryUnion($*, *$), SetOfRationalSeries, IsSubset($*, *$), (p$*, *$), (s$*$), ($\cdots$), `Objekt-var`, `Ex-var`, `Ph-var`, `Værdi`, `Variabel`, Op($*$), Op($*, *$), $* \stackrel{..}{=} *$, ContainsEmpty($*$), Nat($*$), Dedu($*, *$), $\mathrm{Dedu}_0(*, *)$, $\mathrm{Dedu}_s(*, *, *)$, $\mathrm{Dedu}_1(*, *, *)$, $\mathrm{Dedu}_2(*, *, *)$, $\mathrm{Dedu}_3(*, *, *, *)$, $\mathrm{Dedu}_4(*, *, *, *)$, $\mathrm{Dedu}_4^*(*, *, *, *)$, $\mathrm{Dedu}_5(*, *, *)$, $\mathrm{Dedu}_6(*, *, *, *)$, $\mathrm{Dedu}_6^*(*, *, *, *)$, $\mathrm{Dedu}_7(*)$, $\mathrm{Dedu}_8(*, *)$, $\mathrm{Dedu}_8^*(*, *)$, Ex_1, Ex_2, Ex3, Ex_{10}, Ex_{20}, $*_{\mathrm{Ex}}$, $*^{\mathrm{Ex}}$, $\langle * \equiv * \mid * := * \rangle_{\mathrm{Ex}}$, $\langle * \equiv^0 * \mid * := * \rangle_{\mathrm{Ex}}$, $\langle * \equiv^1 * \mid * := * \rangle_{\mathrm{Ex}}$, $\langle * \equiv^* * \mid * := * \rangle_{\mathrm{Ex}}$, ph_1, ph_2, ph_3, $*_{\mathrm{Ph}}$, $*^{\mathrm{Ph}}$, $\langle * \equiv * \mid * := * \rangle_{\mathrm{Ph}}$, $\langle * \equiv^0 * \mid * := * \rangle_{\mathrm{Ph}}$, $\langle * \equiv^1 * \mid * := * \rangle_{\mathrm{Ph}}$, $\langle * \equiv^* * \mid * := * \rangle_{\mathrm{Ph}}$, $\langle * \equiv * \mid * := * \rangle_{\mathrm{Me}}$, $\langle * \equiv^1 * \mid * := * \rangle_{\mathrm{Me}}$, $\langle * \equiv^* * \mid * := * \rangle_{\mathrm{Me}}$, bs, OBS, $\mathcal{BS}$, Ø, SystemQ, MP, Gen, Repetition, Neg, Ded, ExistIntro, Extensionality, Ødef, PairDef, UnionDef, PowerDef, SeparationDef, AddDoubleNeg, RemoveDoubleNeg, AndCommutativity, AutoImply, Contrapositive, FirstConjunct, SecondConjunct, FromContradiction, FromDisjuncts, IffCommutativity, IffFirst, IffSecond, ImplyTransitivity, JoinConjuncts, MP2, MP3, MP4, MP5, MT, NegativeMT, Technicality, Weakening, WeakenOr1, WeakenOr2, Formula2Pair, Pair2Formula, Formula2Union, Union2Formula, Formula2Sep, Sep2Formula, Formula2Power, SubsetInPower, HelperPowerIsSub, PowerIsSub, (Switch)HelperPowerIsSub, (Switch)PowerIsSub, ToSetEquality, HelperToSetEquality(t), ToSetEquality(t), HelperFromSetEquality, FromSetEquality, HelperReflexivity, Reflexivity, HelperSymmetry, Symmetry, HelperTransitivity, Transitivity, ERisReflexive, ERisSymmetric, ERisTransitive, ØisSubset, HelperMemberNotØ, MemberNotØ, HelperUniqueØ, UniqueØ, ==Reflexivity, ==Symmetry, Helper==Transitivity, ==Transitivity, HelperTransferNotEq, TransferNotEq, HelperPairSubset, Helper(2)PairSubset, PairSubset, SamePair, SameSingleton, UnionSubset, SameUnion, SeparationSubset, SameSeparation, SameBinaryUnion, IntersectionSubset, SameIntersection, AutoMember, HelperEqSysNotØ, EqSysNotØ, HelperEqSubset, EqSubset, HelperEqNecessary, EqNecessary, HelperNoneEqNecessary, Helper(2)NoneEqNecessary, NoneEqNecessary, EqClassIsSubset, EqClassesAreDisjoint, AllDisjoint, AllDisjointImply, BSsubset, Union(BS/R)subset, UnionIdentity, EqSysIsPartition, (x1), (x2), (y1), (y2), (v1), (v2), (v3), (v4), (v2n), (m1), (m2), (n1), (n2), (n3), (ϵ), $(\epsilon)_1$, (ϵ2), (fep), (fx), (fy), (fz), (fu), (fv), (fw), (rx), (ry), (rz), (ru), (sx), (sx1), (sy), (sy1), (sz), (sz1), (su), (su1), (fxs), (fys), (crs1), (f1), (f2), (f3), (f4), (op1), (op2), (r1), (s1), (s2), X_1, X_2, Y_1, Y_2, V_1, V_2, V_3, V_4, V_{2n}, M_1, M_2, N_1, N_2, N_3, ϵ, ϵ1, ϵ2, FX, FY, FZ, FU, FV, FW, FEP, RX, RY, RZ, RU, (SX), (SX1), (SY), (SY1), (SZ), (SZ1), (SU), (SU1), FXS, FYS, (F1), (F2), (F3), (F4), (OP1), (OP2), (R1), (S1), (S2), (EPob), (CRS1ob), (F1ob), (F2ob), (F3ob), (F4ob), (N1ob), (N2ob), (OP1ob), (OP2ob), (R1ob), (S1ob), (S2ob), ph_4, ph_5, ph_6, NAT, $RATIONAL_SERIES$, SERIES, SetOfReals, SetOfFxs, N, Q, X, xs, xaF, ysF, us, usFoelge, 0, 1, (−1), 2, 3, 1/2, 1/3, 2/3, 0f, 1f, 00, 01, (− − 01), 02, 01//02, PlusAssociativity(R), PlusAssociativity(R)XX, Plus0(R), Negative(R), Times1(R), lessAddition(R), PlusCommutativity(R), LeqAntisymmetry(R), LeqTransitivity(R), leqAddition(R), Distribution(R), A4(Axiom), InductionAxiom, EqualityAxiom, EqLeqAxiom, EqAdditionAxiom, EqMultiplicationAxiom, QisClosed(Reciprocal)(Imply), QisClosed(Reciprocal), QisClosed(Negative)(Imply), QisClosed(Negative), leqReflexivity, leqAntisymmetryAxiom, leqTransitivityAxiom, leqTotality, leqAdditionAxiom, leqMultiplicationAxiom, plusAssociativity, plusCommutativity, Negative, plus0, timesAssociativity, timesCommutativity, ReciprocalAxiom, times1, Distribution, 0not1, lemma eqLeq(R), TimesAssociativity(R), TimesCommutativity(R), (Adgic)SameR, Separation2formula(1), Separation2formula(2), Cauchy, PlusF, ReciprocalF, From ==, To ==, FromInR, PlusR(Sym), ReciprocalR(Axiom), LessMinus1(N), Nonnegative(N), US0, NextXS(UpperBound), NextXS(NoUpperBound), NextUS(UpperBound), NextUS(NoUpperBound), ExpZero, ExpPositive, ExpZero(R), ExpPositive(R), BSzero, BSpositive, UStelescope(Zero), UStelescope(Positive), EqAddition(R), FromLimit, ToUpperBound, FromUpperBound, USisUpperBound, 0not1(R), ExpUnbounded(R), FromLeq(Advanced)(N), FromLeastUpperBound, ToLeastUpperBound, XSisNotUpperBound, ysFGreater, ysFLess, SmallInverse, NatType, RationalType, SeriesType, Max, Numerical, NumericalF, MemberOfSeries(Imply), JoinConjuncts(2conditions), prop lemma imply negation, TND, FromNegatedImply, ToNegatedImply, FromNegated(2 ∗ Imply), FromNegatedAnd, FromNegatedOr, ToNegatedOr, FromNegations, From3Disjuncts, From2 ∗ 2Disjuncts, NegateDisjunct1, NegateDisjunct2, ExpandDisjuncts, SENC1, SENC2, LessLeq(R), MemberOfSeries, memberOfSeries(Type), ∗(exp)∗, R(∗), − − R(∗), rec∗, ∗/∗, $* \cap *$, ∗[∗], $\cup *$, $* \cup *$, P(∗), {∗}, StateExpand(∗, ∗, ∗), extractSeries(∗), SetOfSeries(∗), − − Macro(∗), ExpandList(∗, ∗, ∗), ∗ ∗ Macro(∗), + + Macro(∗), << Macro(∗), ||Macro(∗), 01//Macro(∗), UB(∗, ∗), LUB(∗, ∗), BS(∗, ∗), UStelescope(∗, ∗), (∗), |f ∗ |, |r ∗ |, Limit(∗, ∗), Union(∗), IsOrderedPair(∗, ∗, ∗), IsRelation(∗, ∗, ∗), isFunction(∗, ∗, ∗), IsSeries(∗, ∗), IsNatural(∗, ∗), OrderedPair(∗, ∗), TypeNat(∗), TypeNat0(∗), TypeRational(∗), TypeRational0(∗), TypeSeries(∗, ∗), Typeseries0(∗, ∗), {∗, ∗}, $\langle *, * \rangle$, (−u∗), $-_f *$, (− − ∗), 1f/∗, 01//temp∗, ∗(∗, ∗), ReflRel(∗, ∗), SymRel(∗, ∗), TransRel(∗, ∗), EqRel(∗, ∗), $[* \in *]_*$, Partition(∗, ∗), (∗ ∗ ∗), $* *_f *$, ∗ ∗ ∗∗, (∗ + ∗), (∗ − ∗), $* +_f *$, $* -_f *$, ∗ + +∗, R(∗) − −R(∗), $* \in *$, | ∗ |, if(∗, ∗, ∗), Max(∗, ∗), Max(∗, ∗), ∗ = ∗, $* \neq *$, ∗ <= ∗, ∗ < ∗, $* <_f *$, $* \leq_f *$, SF(∗, ∗), ∗ == ∗, ∗!! == ∗, ∗ << ∗, ∗ <<== ∗, ∗===∗, $* \subseteq *$, $\dot{\neg}$ (∗)n, $* \notin *$, $* \neq *$,

$* \dot{\wedge} *$, $* \dot{\vee} *$, $\exists * \colon *$, $* \dot{\Leftrightarrow} *$, $\{ph \in * \mid *\}$,

$\exists * \colon *$

[$\exists$x: y $\stackrel{\text{tex}}{\rightarrow}$ "(AARRGGHH!-exist-bug!)"]

$* \Rightarrow *$

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

kvanti

[kvanti $\stackrel{\text{prio}}{\rightarrow}$
Preassociative
[kvanti], [base], [bracket $*$ end bracket], [big bracket $*$ end bracket], [\$ $*$ \$], [**flush left** [$*$]], [x], [y], [z], [[$* \bowtie *$]], [[$* \stackrel{*}{\rightarrow} *$]], [pyk], [tex], [name], [prio], [$*$], [T], [if($*, *, *$)], [[$* \stackrel{*}{\Rightarrow} *$]], [val], [claim], [$\bot$], [f($*$)], [$(*)^{\mathrm{I}}$], [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**($*, *$)], [$\mathbf{apply}_1(*, *)$], [identifier($*$)], [$\mathrm{identifier}_1(*, *)$], [array-plus($*, *$)], [array-remove($*, *, *$)], [array-put($*, *, *, *$)], [array-add($*, *, *, *, *$)], [bit($*, *$)], [$\mathrm{bit}_1(*, *)$], [rack], ["vector"], ["bibliography"], ["dictionary"], ["body"], ["codex"], ["expansion"], ["code"], ["cache"], ["diagnose"], ["pyk"], ["tex"], ["texname"], ["value"], ["message"], ["macro"], ["definition"], ["unpack"], ["claim"], ["priority"], ["lambda"], ["apply"], ["true"], ["if"], ["quote"], ["proclaim"], ["define"], ["introduce"], ["hide"], ["pre"], ["post"], [$\mathcal{E}(*, *, *)$], [$\mathcal{E}_2(*, *, *, *, *)$], [$\mathcal{E}_3(*, *, *, *)$], [$\mathcal{E}_4(*, *, *, *)$], [**lookup**($*, *, *$)], [**abstract**($*, *, *, *$)], [[$\lceil * \rceil$]], [$\mathcal{M}(*, *, *)$], [$\mathcal{M}_2(*, *, *, *)$], [$\mathcal{M}^*(*, *, *)$], [macro], [$s_0$], [**zip**($*, *$)], [$\mathbf{assoc}_1(*, *, *)$], [$(*)^{\mathbf{P}}$], [self], [[$* \ddot{=} *$]], [[$* \doteq *$]], [[$* \acute{=} *$]], [[$* \stackrel{\text{pyk}}{=} *$]], [[$* \stackrel{\text{tex}}{=} *$]], [[$* \stackrel{\text{name}}{=} *$]], [**Priority table**[$*$]], [$\tilde{\mathcal{M}}_1$], [$\tilde{\mathcal{M}}_2(*)$], [$\tilde{\mathcal{M}}_3(*)$], [$\tilde{\mathcal{M}}_4(*, *, *, *)$], [$\tilde{\mathcal{M}}(*, *, *)$], [$\tilde{\mathcal{Q}}(*, *, *)$], [$\tilde{\mathcal{Q}}_2(*, *, *)$], [$\tilde{\mathcal{Q}}_3(*, *, *, *)$], [$\tilde{\mathcal{Q}}^*(*, *, *)$], [($*$)], [($*$)], [display($*$)], [statement($*$)], [$[*]^{\cdot}$], [$[*]^{-}$], [**aspect**($*, *$)], [**aspect**($*, *, *$)], [$\langle * \rangle$], [$\mathbf{tuple}_1(*)$], [$\mathbf{tuple}_2(*)$], [$\mathrm{let}_2(*, *)$], [$\mathrm{let}_1(*, *)$], [[$* \stackrel{\text{claim}}{=} *$]], [checker], [**check**($*, *$)], [$\mathbf{check}_2(*, *, *)$], [$\mathbf{check}_3(*, *, *)$], [$\mathbf{check}^*(*, *)$], [$\mathbf{check}^*_2(*, *, *)$], [$[*]^{\cdot}$], [$[*]^{-}$], [$[*]^{\circ}$], [msg], [[$* \stackrel{\text{msg}}{=} *$]], [<stmt>], [stmt], [[$* \stackrel{\text{stmt}}{=} *$]], [HeadNil′], [HeadPair′], [Transitivity′], [$\perp\!\!\!\perp$], [Contra′], [T'_{E}], [L_1], [$\underline{*}$], [$\mathcal{A}$], [$\mathcal{B}$], [$\mathcal{C}$], [$\mathcal{D}$], [$\mathcal{E}$], [$\mathcal{F}$], [$\mathcal{G}$], [$\mathcal{H}$], [$\mathcal{I}$], [$\mathcal{J}$], [$\mathcal{K}$], [$\mathcal{L}$], [$\mathcal{M}$], [$\mathcal{N}$], [$\mathcal{O}$], [$\mathcal{P}$], [$\mathcal{Q}$], [$\mathcal{R}$], [$\mathcal{S}$], [$\mathcal{T}$], [$\mathcal{U}$], [$\mathcal{V}$], [$\mathcal{W}$], [$\mathcal{X}$], [$\mathcal{Y}$], [$\mathcal{Z}$], [$\langle * \mid * := * \rangle$], [$\langle^* * \mid * := * \rangle$], [$\emptyset$], [Remainder],

$[(*)^{\mathbf{v}}]$, [intro$(*,*,*,*)$], [intro$(*,*,*)$], [error$(*,*)$], [error$_2(*,*)$], [proof$(*,*,*)$],
[proof$_2(*,*)$], $[\mathcal{S}(*,*)]$, $[\mathcal{S}^{\mathrm{I}}(*,*)]$, $[\mathcal{S}^{\rhd}(*,*)]$, $[\mathcal{S}^{\rhd}_1(*,*,*)]$, $[\mathcal{S}^{\mathrm{E}}(*,*)]$, $[\mathcal{S}^{\mathrm{E}}_1(*,*,*)]$,
$[\mathcal{S}^{+}(*,*)]$, $[\mathcal{S}^{+}_1(*,*,*)]$, $[\mathcal{S}^{-}(*,*)]$, $[\mathcal{S}^{-}_1(*,*,*)]$, $[\mathcal{S}^{*}(*,*)]$, $[\mathcal{S}^{*}_1(*,*,*)]$,
$[\mathcal{S}^{*}_2(*,*,*,*)]$, $[\mathcal{S}^{@}(*,*)]$, $[\mathcal{S}^{@}_1(*,*,*)]$, $[\mathcal{S}^{\vdash}(*,*)]$, $[\mathcal{S}^{\vdash}_1(*,*,*,*)]$, $[\mathcal{S}^{\Vdash}(*,*)]$,
$[\mathcal{S}^{\Vdash}_1(*,*,*,*)]$, $[\mathcal{S}^{\text{i.e.}}(*,*)]$, $[\mathcal{S}^{\text{i.e.}}_1(*,*,*,*)]$, $[\mathcal{S}^{\text{i.e.}}_2(*,*,*,*,*)]$, $[\mathcal{S}^{\forall}(*,*)]$,
$[\mathcal{S}^{\forall}_1(*,*,*,*)]$, $[\mathcal{S}^{;}(*,*)]$, $[\mathcal{S}^{;}_1(*,*,*)]$, $[\mathcal{S}^{;}_2(*,*,*,*)]$, $[\mathcal{T}(*)]$, [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], [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], [[$* \stackrel{\text{tactic}}{=} *$]], $[\mathcal{P}(*,*,*)]$,
$[\mathcal{P}^*(*,*,*)]$, [p$_0$], [conclude$_1(*,*)$], [conclude$_2(*,*,*)$], [conclude$_3(*,*,*,*)$],
[conclude$_4(*,*)$], [check], [[$* \stackrel{\circ}{=} *$]], [RootVisible$(*)$], [A], [R], [C], [T], [L], [$\{*\}$], [$\overline{*}$],
[a], [b], [c], [d], [e], [f], [g], [h], [i], [j], [k], [l], [m], [n], [o], [p], [q], [r], [s], [t], [u], [v],
[w], [x], [y], [z], [$\langle * \equiv * \mid * := * \rangle$], [$\langle * \equiv^0 * \mid * := * \rangle$], [$\langle * \equiv^1 * \mid * := * \rangle$], [$\langle * \equiv^* * \mid * := * \rangle$],
[Ded$(*,*)$], [Ded$_0(*,*)$], [Ded$_1(*,*,*)$], [Ded$_2(*,*,*)$], [Ded$_3(*,*,*,*)$],
[Ded$_4(*,*,*,*)$], [Ded$^*_4(*,*,*,*)$], [Ded$_5(*,*,*)$], [Ded$_6(*,*,*,*)$],
[Ded$^*_6(*,*,*,*)$], [Ded$_7(*)$], [Ded$_8(*,*)$], [Ded$^*_8(*,*)$], [S], [Neg], [MP], [Gen],
[Ded], [S1], [S2], [S3], [S4], [S5], [S6], [S7], [S8], [S9], [Repetition], [A1$'$], [A2$'$], [A4$'$],
[A5$'$], [Prop 3.2a], [Prop 3.2b], [Prop 3.2c], [Prop 3.2d], [Prop 3.2e$_1$], [Prop 3.2e$_2$],
[Prop 3.2e], [Prop 3.2f$_1$], [Prop 3.2f$_2$], [Prop 3.2f], [Prop 3.2g$_1$], [Prop 3.2g$_2$],
[Prop 3.2g], [Prop 3.2h$_1$], [Prop 3.2h$_2$], [Prop 3.2h], [Block$_1(*,*,*)$], [Block$_2(*)$],
[UniqueMember], [UniqueMember(Type)], [SameSeries], [A4], [SameMember],
[Qclosed(Addition)], [Qclosed(Multiplication)], [FromCartProd(1)],
[1rule fromCartProd(2)], [constantRationalSeries$(*)$], [cartProd$(*)$], [Power$(*)$],
[binaryUnion$(*,*)$], [SetOfRationalSeries], [IsSubset$(*,*)$], [(p$*,*$)], [(s$*$)],
[$(\cdots)$], [`Objekt-var`], [`Ex-var`], [`Ph-var`], [`Værdi`], [`Variabel`], [Op$(*)$], [Op$(*,*)$],
[$* \mathrel{\ddot{=\!=}} *$], [ContainsEmpty$(*)$], [Nat$(*)$], [Dedu$(*,*)$], [Dedu$_0(*,*)$],
[Dedu$_\mathrm{s}(*,*,*)$], [Dedu$_1(*,*,*)$], [Dedu$_2(*,*,*)$], [Dedu$_3(*,*,*,*)$],
[Dedu$_4(*,*,*,*)$], [Dedu$^*_4(*,*,*,*)$], [Dedu$_5(*,*,*)$], [Dedu$_6(*,*,*,*)$],
[Dedu$^*_6(*,*,*,*)$], [Dedu$_7(*)$], [Dedu$_8(*,*)$], [Dedu$^*_8(*,*)$], [Ex$_1$], [Ex$_2$], [Ex3],
[Ex$_{10}$], [Ex$_{20}$], [$*_{\mathrm{Ex}}$], [$*^{\mathrm{Ex}}$], [$\langle * \equiv * \mid * :=\!=\!= * \rangle_{\mathrm{Ex}}$], [$\langle * \equiv^0 * \mid * :=\!=\!= * \rangle_{\mathrm{Ex}}$],
[$\langle * \equiv^1 * \mid * :=\!=\!= * \rangle_{\mathrm{Ex}}$], [$\langle * \equiv^* * \mid * :=\!=\!= * \rangle_{\mathrm{Ex}}$], [ph$_1$], [ph$_2$], [ph$_3$], [$*_{\mathrm{Ph}}$], [$*^{\mathrm{Ph}}$],
[$\langle * \equiv * \mid * :=\!=\!= * \rangle_{\mathrm{Ph}}$], [$\langle * \equiv^0 * \mid * :=\!=\!= * \rangle_{\mathrm{Ph}}$], [$\langle * \equiv^1 * \mid * :=\!=\!= * \rangle_{\mathrm{Ph}}$],
[$\langle * \equiv^* * \mid * :=\!=\!= * \rangle_{\mathrm{Ph}}$], [$\langle * \equiv * \mid * :=\!=\!= * \rangle_{\mathrm{Me}}$], [$\langle * \equiv^1 * \mid * :=\!=\!= * \rangle_{\mathrm{Me}}$],
[$\langle * \equiv^* * \mid * :=\!=\!= * \rangle_{\mathrm{Me}}$], [$\mathsf{bs}$], [$\mathsf{OBS}$], [$\mathcal{BS}$], [Ø], [SystemQ], [MP], [Gen], [Repetition],

[Neg], [Ded], [ExistIntro], [Extensionality], [∅def], [PairDef], [UnionDef], [PowerDef], [SeparationDef], [AddDoubleNeg], [RemoveDoubleNeg], [AndCommutativity], [AutoImply], [Contrapositive], [FirstConjunct], [SecondConjunct], [FromContradiction], [FromDisjuncts], [IffCommutativity], [IffFirst], [IffSecond], [ImplyTransitivity], [JoinConjuncts], [MP2], [MP3], [MP4], [MP5], [MT], [NegativeMT], [Technicality], [Weakening], [WeakenOr1], [WeakenOr2], [Formula2Pair], [Pair2Formula], [Formula2Union], [Union2Formula], [Formula2Sep], [Sep2Formula], [Formula2Power], [SubsetInPower], [HelperPowerIsSub], [PowerIsSub], [(Switch)HelperPowerIsSub], [(Switch)PowerIsSub], [ToSetEquality], [HelperToSetEquality(t)], [ToSetEquality(t)], [HelperFromSetEquality], [FromSetEquality], [HelperReflexivity], [Reflexivity], [HelperSymmetry], [Symmetry], [HelperTransitivity], [Transitivity], [ERisReflexive], [ERisSymmetric], [ERisTransitive], [∅isSubset], [HelperMemberNot∅], [MemberNot∅], [HelperUnique∅], [Unique∅], [==Reflexivity], [==Symmetry], [Helper==Transitivity], [==Transitivity], [HelperTransferNotEq], [TransferNotEq], [HelperPairSubset], [Helper(2)PairSubset], [PairSubset], [SamePair], [SameSingleton], [UnionSubset], [SameUnion], [SeparationSubset], [SameSeparation], [SameBinaryUnion], [IntersectionSubset], [SameIntersection], [AutoMember], [HelperEqSysNot∅], [EqSysNot∅], [HelperEqSubset], [EqSubset], [HelperEqNecessary], [EqNecessary], [HelperNoneEqNecessary], [Helper(2)NoneEqNecessary], [NoneEqNecessary], [EqClassIsSubset], [EqClassesAreDisjoint], [AllDisjoint], [AllDisjointImply], [BSsubset], [Union(BS/R)subset], [UnionIdentity], [EqSysIsPartition], [(x1)], [(x2)], [(y1)], [(y2)], [(v1)], [(v2)], [(v3)], [(v4)], [(v2n)], [(m1)], [(m2)], [(n1)], [(n2)], [(n3)], [(ϵ)], [$(\epsilon)_1$], [(ϵ2)], [(fep)], [(fx)], [(fy)], [(fz)], [(fu)], [(fv)], [(fw)], [(rx)], [(ry)], [(rz)], [(ru)], [(sx)], [(sx1)], [(sy)], [(sy1)], [(sz)], [(sz1)], [(su)], [(su1)], [(fxs)], [(fys)], [(crs1)], [(f1)], [(f2)], [(f3)], [(f4)], [(op1)], [(op2)], [(r1)], [(s1)], [(s2)], [X_1], [X_2], [Y_1], [Y_2], [V_1], [V_2], [V_3], [V_4], [V_{2n}], [M_1], [M_2], [N_1], [N_2], [N_3], [ϵ], [ϵ1], [ϵ2], [FX], [FY], [FZ], [FU], [FV], [FW], [FEP], [RX], [RY], [RZ], [RU], [(SX)], [(SX1)], [(SY)], [(SY1)], [(SZ)], [(SZ1)], [(SU)], [(SU1)], [FXS], [FYS], [(F1)], [(F2)], [(F3)], [(F4)], [(OP1)], [(OP2)], [(R1)], [(S1)], [(S2)], [(EPob)], [(CRS1ob)], [(F1ob)], [(F2ob)], [(F3ob)], [(F4ob)], [(N1ob)], [(N2ob)], [(OP1ob)], [(OP2ob)], [(R1ob)], [(S1ob)], [(S2ob)], [ph_4], [ph_5], [ph_6], [NAT], [RATIONAL$_S$ERIES], [SERIES], [SetOfReals], [SetOfFxs], [N], [Q], [X], [xs], [xaF], [ysF], [us], [usFoelge], [0], [1], [(-1)], [2], [3], [1/2], [1/3], [2/3], [0f], [1f], [00], [01], [$(--01)$], [02], [01//02], [PlusAssociativity(R)], [PlusAssociativity(R)XX], [Plus0(R)], [Negative(R)], [Times1(R)], [lessAddition(R)], [PlusCommutativity(R)], [LeqAntisymmetry(R)], [LeqTransitivity(R)], [leqAddition(R)], [Distribution(R)], [A4(Axiom)], [InductionAxiom], [EqualityAxiom], [EqLeqAxiom], [EqAdditionAxiom], [EqMultiplicationAxiom], [QisClosed(Reciprocal)(Imply)], [QisClosed(Reciprocal)], [QisClosed(Negative)(Imply)], [QisClosed(Negative)], [leqReflexivity], [leqAntisymmetryAxiom], [leqTransitivityAxiom], [leqTotality], [leqAdditionAxiom], [leqMultiplicationAxiom], [plusAssociativity], [plusCommutativity], [Negative], [plus0], [timesAssociativity], [timesCommutativity], [ReciprocalAxiom], [times1], [Distribution], [0not1], [lemma eqLeq(R)], [TimesAssociativity(R)], [TimesCommutativity(R)], [(Adgic)SameR], [Separation2formula(1)], [Separation2formula(2)], [Cauchy], [PlusF], [ReciprocalF], [From ==], [To ==], [FromInR], [PlusR(Sym)], [ReciprocalR(Axiom)], [LessMinus1(N)], [Nonnegative(N)], [US0], [NextXS(UpperBound)], [NextXS(NoUpperBound)], [NextUS(UpperBound)], [NextUS(NoUpperBound)], [ExpZero], [ExpPositive], [ExpZero(R)], [ExpPositive(R)], [BSzero], [BSpositive], [UStelescope(Zero)], [UStelescope(Positive)], [EqAddition(R)], [FromLimit], [ToUpperBound], [FromUpperBound], [USisUpperBound], [0not1(R)], [ExpUnbounded(R)], [FromLeq(Advanced)(N)], [FromLeastUpperBound], [ToLeastUpperBound], [XSisNotUpperBound], [ysFGreater], [ysFLess], [SmallInverse], [NatType], [RationalType], [SeriesType], [Max], [Numerical], [NumericalF], [MemberOfSeries(Imply)], [JoinConjuncts(2conditions)], [prop lemma imply negation], [TND], [FromNegatedImply], [ToNegatedImply], [FromNegated(2 ∗ Imply)], [FromNegatedAnd], [FromNegatedOr], [ToNegatedOr], [FromNegations], [From3Disjuncts], [From2 ∗ 2Disjuncts], [NegateDisjunct1], [NegateDisjunct2], [ExpandDisjuncts], [SENC1], [SENC2], [LessLeq(R)], [MemberOfSeries], [memberOfSeries(Type)];

Preassociative

[∗_{∗}], [∗/indexintro(∗, ∗, ∗, ∗)], [∗/intro(∗, ∗, ∗)], [∗/bothintro(∗, ∗, ∗, ∗, ∗)], [∗/nameintro(∗, ∗, ∗, ∗)], [∗′], [∗[∗]], [∗[∗→∗]], [∗[∗⇒∗]], [∗0], [∗1], [0b], [∗-color(∗)], [∗-color*(∗)], [$*^{\mathrm{H}}$], [$*^{\mathrm{T}}$], [$*^{\mathrm{U}}$], [$*^{\mathrm{h}}$], [$*^{\mathrm{t}}$], [$*^{\mathrm{s}}$], [$*^{\mathrm{c}}$], [$*^{\mathrm{d}}$], [$*^{\mathrm{a}}$], [$*^{\mathrm{C}}$], [$*^{\mathrm{M}}$], [$*^{\mathrm{B}}$], [$*^{\mathrm{r}}$], [$*^{\mathrm{i}}$], [$*^{\mathrm{d}}$], [$*^{\mathrm{R}}$], [$*^{0}$], [$*^{1}$], [$*^{2}$], [$*^{3}$], [$*^{4}$], [$*^{5}$], [$*^{6}$], [$*^{7}$], [$*^{8}$], [$*^{9}$], [$*^{\mathrm{E}}$], [$*^{\mathcal{V}}$], [$*^{\mathcal{C}}$], [$*^{\mathcal{C}^*}$], [$*^{\mathrm{hide}}$];

Preassociative

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

Preassociative

[∗ ’ ∗], [∗ ‘ ∗];

Preassociative

[∗(exp)∗];

Preassociative

[∗′], [R(∗)], [− − R(∗)], [rec∗];

Preassociative

[∗/∗], [∗ ∩ ∗], [∗[∗]];

Preassociative

[∪∗], [∗ ∪ ∗], [P(∗)];

Preassociative

$[\{*\}], [\mathrm{StateExpand}(*,*,*)], [\mathrm{extractSeries}(*)], [\mathrm{SetOfSeries}(*)], [--\mathrm{Macro}(*)],$
$[\mathrm{ExpandList}(*,*,*)], [**\mathrm{Macro}(*)], [++\mathrm{Macro}(*)], [<<\mathrm{Macro}(*)],$
$[||\mathrm{Macro}(*)], [01//\mathrm{Macro}(*)], [\mathrm{UB}(*,*)], [\mathrm{LUB}(*,*)], [\mathrm{BS}(*,*)],$
$[\mathrm{UStelescope}(*,*)], [(*)], [|\mathrm{f}*|], [|\mathrm{r}*|], [\mathrm{Limit}(*,*)], [\mathrm{Union}(*)],$
$[\mathrm{IsOrderedPair}(*,*,*)], [\mathrm{IsRelation}(*,*,*)], [\mathrm{isFunction}(*,*,*)], [\mathrm{IsSeries}(*,*)],$
$[\mathrm{IsNatural}(*,*)], [\mathrm{OrderedPair}(*,*)], [\mathrm{TypeNat}(*)], [\mathrm{TypeNat0}(*)],$
$[\mathrm{TypeRational}(*)], [\mathrm{TypeRational0}(*)], [\mathrm{TypeSeries}(*,*)], [\mathrm{Typeseries0}(*,*)];$

Preassociative

$[\{*,*\}], [\langle *,*\rangle], [(-\mathrm{u}*)], [-_{\mathrm{f}}*], [(--*)], [1\mathrm{f}/*], [01//\mathrm{temp}*];$

Preassociative

$[*(*,*)], [\mathrm{ReflRel}(*,*)], [\mathrm{SymRel}(*,*)], [\mathrm{TransRel}(*,*)], [\mathrm{EqRel}(*,*)], [[*\in *]_*],$
$[\mathrm{Partition}(*,*)];$

Preassociative

$[*\cdot *], [*\cdot_0 *], [(***)], [* *_{\mathrm{f}} *], [****];$

Preassociative

$[*+*], [*+_0 *], [*+_1 *], [*-*], [*-_0 *], [*-_1 *], [(*+*)], [(*-*)], [*+_{\mathrm{f}} *],$
$[*-_{\mathrm{f}} *], [*++*], [\mathrm{R}(*)--\mathrm{R}(*)];$

Preassociative

$[*\in *];$

Preassociative

$[|*|], [\mathrm{if}(*,*,*)], [\mathrm{Max}(*,*)], [\mathrm{Max}(*,*)];$

Preassociative

$[*=*], [*\neq *], [*<=*], [*<*], [*<_{\mathrm{f}} *], [*\leq_{\mathrm{f}} *], [\mathrm{SF}(*,*)], [*==*],$
$[*!!==*], [*<<*], [*<<==*];$

Preassociative

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

Postassociative

$[*\therefore *], [*\underline{\therefore} *], [*\underline{::} *], [*\underline{+2*} *], [*::*], [*+2**];$

Postassociative

$[*,*];$

Preassociative

$[*\overset{\mathrm{B}}{\approx} *], [*\overset{\mathrm{D}}{\approx} *], [*\overset{\mathrm{C}}{\approx} *], [*\overset{\mathrm{P}}{\approx} *], [*\approx *], [*=*], [*\overset{+}{\to} *], [*\overset{\mathrm{t}}{=} *], [*\overset{\mathrm{t}^*}{=} *], [*\overset{\mathrm{r}}{=} *],$
$[*\in_{\mathrm{t}} *], [*\subseteq_{\mathrm{T}} *], [*\overset{\mathrm{T}}{=} *], [*\overset{\mathrm{s}}{=} *], [*\text{ free in }*], [*\text{ free in}^* *], [*\text{ free for }*\text{ in }*],$
$[*\text{ free for}^* *\text{ in }*], [*\in_{\mathrm{c}} *], [*<*], [*<' *], [*\leq' *], [*=*], [*\neq *], [*^{\mathrm{var}}],$
$[*\#^0 *], [*\#^1 *], [*\#^* *], [*==*], [*\subseteq *];$

Preassociative

$[\neg *], [\dot{-}(*)\mathrm{n}], [*\notin *], [*\neq *];$

Preassociative

$[*\wedge *], [*\ddot{\wedge} *], [*\tilde{\wedge} *], [*\wedge_{\mathrm{c}} *], [*\dot{\wedge} *];$

Preassociative

$[*\vee *], [*\parallel *], [*\ddot{\vee} *];$

Postassociative

$[*\dot{\vee} *];$

Preassociative

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

Postassociative
$[* \ddot{\Rightarrow} *], [* \Rightarrow *], [* \Leftrightarrow *], [* \dot{\Leftrightarrow} *];$
Preassociative
$[\{\mathrm{ph} \in * \mid *\}];$
Postassociative
$[* : *], [* \text{ spy } *], [*!*];$
Preassociative
$[* \left\{ \begin{array}{c} * \\ * \end{array} \right.];$
Preassociative
$[\lambda * .*], [\Lambda * .*], [\Lambda *], [\textbf{if } * \textbf{ then } * \textbf{ else } *], [\textbf{let } * = * \textbf{ in } *], [\textbf{let } * \ddot{=} * \text{ in } *];$
Preassociative
$[*\#*];$
Preassociative
$[*^{\mathrm{I}}], [*^{\triangleright}], [*^{\mathrm{V}}], [*^{+}], [*^{-}], [*^{*}];$
Preassociative
$[* @ *], [* \rhd *], [* \gg *], [* \gg *], [* \unrhd *];$
Postassociative
$[* \vdash *], [* \Vdash *], [* \text{ i.e. } *];$
Preassociative
$[\forall * : *], [\Pi * : *];$
Postassociative
$[* \oplus *];$
Postassociative
$[*; *];$
Preassociative
$[* \text{ proves } *];$
Preassociative
$[* \textbf{ proof of } * : *], [\text{Line} * : * \gg *; *], [\text{Last line} * \gg * \square],$
$[\text{Line} * : \text{Premise} \gg *; *], [\text{Line} * : \text{Side-condition} \gg *; *], [\text{Arbitrary} \gg *; *],$
$[\text{Local} \gg * = *; *], [\text{Begin} *; * : \text{End}; *], [\text{Last block line} * \gg * ;],$
$[\text{Arbitrary} \gg *; *];$
Postassociative
$[* \mid *];$
Postassociative
$[* , *], [*[*]*];$
Preassociative
$[*\&*];$
Preassociative
$[*\backslash\backslash*], [* \text{ linebreak}[4] *], [*\backslash\backslash*];]$

$[\text{kvanti} \stackrel{\text{tex}}{\rightarrow} \text{“kvanti”}]$

$[\text{kvanti} \stackrel{\text{pyk}}{\rightarrow} \text{“kvanti”}]$

UniqueMember

[UniqueMember $\stackrel{\text{tex}}{\to}$ "UniqueMember"]

[UniqueMember $\stackrel{\text{pyk}}{\to}$ "lemma uniqueMember"]

UniqueMember(Type)

[UniqueMember(Type) $\stackrel{\text{tex}}{\to}$ "UniqueMember(Type)"]

[UniqueMember(Type) $\stackrel{\text{pyk}}{\to}$ "lemma uniqueMember(Type)"]

SameSeries

[SameSeries $\stackrel{\text{tex}}{\to}$ "SameSeries"]

[SameSeries $\stackrel{\text{pyk}}{\to}$ "lemma sameSeries"]

A4

[A4 $\stackrel{\text{tex}}{\to}$ "A4"]

[A4 $\stackrel{\text{pyk}}{\to}$ "lemma a4"]

SameMember

[SameMember $\stackrel{\text{tex}}{\to}$ "SameMember"]

[SameMember $\stackrel{\text{pyk}}{\to}$ "lemma sameMember"]

Qclosed(Addition)

[Qclosed(Addition) $\stackrel{\text{tex}}{\to}$ "Qclosed(Addition)"]

[Qclosed(Addition) $\stackrel{\text{pyk}}{\to}$ "1rule Qclosed(Addition)"]

Qclosed(Multiplication)

[Qclosed(Multiplication) $\stackrel{\text{tex}}{\to}$ "Qclosed(Multiplication)"]

[Qclosed(Multiplication) $\stackrel{\text{pyk}}{\to}$ "1rule Qclosed(Multiplication)"]

FromCartProd(1)

[FromCartProd(1) $\stackrel{\text{tex}}{\to}$ "FromCartProd(1)"]

[FromCartProd(1) $\stackrel{\text{pyk}}{\to}$ "1rule fromCartProd(1)"]

1rule fromCartProd(2)

[1rule fromCartProd(2) $\stackrel{\text{pyk}}{\to}$ "1rule fromCartProd(2)"]

constantRationalSeries(∗)

[constantRationalSeries(x) $\stackrel{\text{tex}}{\to}$ "constantRationalSeries(#1.
)"]

[constantRationalSeries(∗) $\stackrel{\text{pyk}}{\to}$ "constantRationalSeries(")"]

cartProd(∗)

[cartProd(x) $\stackrel{\text{tex}}{\to}$ "cartProd(#1.
)"]

[cartProd(∗) $\stackrel{\text{pyk}}{\to}$ "cartProd(" , ")"]

Power(∗)

[Power(x) $\stackrel{\text{tex}}{\to}$ "Power(#1.
)"]

[Power(∗) $\stackrel{\text{pyk}}{\to}$ "P(")"]

binaryUnion(∗, ∗)

[binaryUnion(x, y) $\stackrel{\text{tex}}{\to}$ "binaryUnion(#1.
, #2.

)”]

[binaryUnion(∗, ∗) $\stackrel{\text{pyk}}{\rightarrow}$ “binaryUnion(" , ")”]

SetOfRationalSeries

[SetOfRationalSeries $\stackrel{\text{tex}}{\rightarrow}$ “SetOfRationalSeries”]

[SetOfRationalSeries $\stackrel{\text{pyk}}{\rightarrow}$ “setOfRationalSeries”]

IsSubset(∗, ∗)

[IsSubset(x, y) $\stackrel{\text{tex}}{\rightarrow}$ “IsSubset(#1.
, #2.
)”]

[IsSubset(∗, ∗) $\stackrel{\text{pyk}}{\rightarrow}$ “isSubset(" , ")”]

(p∗, ∗)

[(px, y) $\stackrel{\text{tex}}{\rightarrow}$ “(p#1.
, #2.
)”]

[(p∗, ∗) $\stackrel{\text{pyk}}{\rightarrow}$ “(p " , ")”]

(s∗)

[(sx) $\stackrel{\text{tex}}{\rightarrow}$ “(s#1.
)”]

[(s∗) $\stackrel{\text{pyk}}{\rightarrow}$ “(s ")”]

$(\cdots)$

[$(\cdots)$ $\stackrel{\text{tex}}{\rightarrow}$ “(\cdots{})”]

[$(\cdots)$ $\stackrel{\text{pyk}}{\rightarrow}$ “cdots”]

Objekt-var

[Objekt-var $\stackrel{\text{tex}}{\to}$ "\texttt{Objekt-var}"]

[Objekt-var $\stackrel{\text{pyk}}{\to}$ "object-var"]

Ex-var

[Ex-var $\stackrel{\text{tex}}{\to}$ "\texttt{Ex-var}"]

[Ex-var $\stackrel{\text{pyk}}{\to}$ "ex-var"]

Ph-var

[Ph-var $\stackrel{\text{tex}}{\to}$ "\texttt{Ph-var}"]

[Ph-var $\stackrel{\text{pyk}}{\to}$ "ph-var"]

Værdi

[Værdi $\stackrel{\text{tex}}{\to}$ "\texttt{V\ae{}rdi}"]

[Værdi $\stackrel{\text{pyk}}{\to}$ "vaerdi"]

Variabel

[Variabel $\stackrel{\text{tex}}{\to}$ "\texttt{Variabel}"]

[Variabel $\stackrel{\text{pyk}}{\to}$ "variabel"]

Op(∗)

[Op(x) $\stackrel{\text{tex}}{\to}$ "Op(#1.
)"]

[Op(∗) $\stackrel{\text{pyk}}{\to}$ "op " end op"]

Op(*, *)

[Op(x, y) $\stackrel{\text{tex}}{\to}$ “Op(#1.
, #2.
)”]

[Op(*, *) $\stackrel{\text{pyk}}{\to}$ “op2 " comma " end op2”]

$* \mathrel{\ddot{==}} *$

[$x \mathrel{\ddot{==}} y$ $\stackrel{\text{tex}}{\to}$ “#1.
\mathrel {\ddot {==}} #2.”]

[$* \mathrel{\ddot{==}} *$ $\stackrel{\text{pyk}}{\to}$ “define-equal " comma " end equal”]

ContainsEmpty(*)

[ContainsEmpty(x) $\stackrel{\text{tex}}{\to}$ “ContainsEmpty(#1.
)”]

[ContainsEmpty(*) $\stackrel{\text{pyk}}{\to}$ “contains-empty " end empty”]

Nat(*)

[Nat(x) $\stackrel{\text{tex}}{\to}$ “Nat(#1.
)”]

[Nat(*) $\stackrel{\text{pyk}}{\to}$ “Nat(")”]

Dedu(*, *)

[Dedu(x, y) $\stackrel{\text{tex}}{\to}$ “
Dedu(#1.
, #2.
)”]

[Dedu(*, *) $\stackrel{\text{pyk}}{\to}$ “1deduction " conclude " end 1deduction”]

$\mathrm{Dedu}_0(*, *)$

$[\mathrm{Dedu}_0(\mathsf{x}, \mathsf{y}) \stackrel{\mathrm{tex}}{\to}$ "
Dedu_0(#1.
, #2.
)"]

$[\mathrm{Dedu}_0(*, *) \stackrel{\mathrm{pyk}}{\to}$ "1deduction zero " conclude " end 1deduction"]

$\mathrm{Dedu}_{\mathrm{s}}(*, *, *)$

$[\mathrm{Dedu}_{\mathrm{s}}(\mathsf{x}, \mathsf{y}, \mathsf{z}) \stackrel{\mathrm{tex}}{\to}$ "Dedu_{s}(#1.
, #2.
, #3.
)"]

$[\mathrm{Dedu}_{\mathrm{s}}(*, *, *) \stackrel{\mathrm{pyk}}{\to}$ "1deduction side " conclude " condition " end 1deduction"]

$\mathrm{Dedu}_1(*, *, *)$

$[\mathrm{Dedu}_1(\mathsf{x}, \mathsf{y}, \mathsf{z}) \stackrel{\mathrm{tex}}{\to}$ "
Dedu_1(#1.
, #2.
, #3.
)"]

$[\mathrm{Dedu}_1(*, *, *) \stackrel{\mathrm{pyk}}{\to}$ "1deduction one " conclude " condition " end 1deduction"]

$\mathrm{Dedu}_2(*, *, *)$

$[\mathrm{Dedu}_2(\mathsf{x}, \mathsf{y}, \mathsf{z}) \stackrel{\mathrm{tex}}{\to}$ "
Dedu_2(#1.
, #2.
, #3.
)"]

$[\mathrm{Dedu}_2(*, *, *) \stackrel{\mathrm{pyk}}{\to}$ "1deduction two " conclude " condition " end 1deduction"]

$\mathrm{Dedu}_3(*, *, *, *)$

[$\mathrm{Dedu}_3(\mathsf{x}, \mathsf{y}, \mathsf{z}, \mathsf{u}) \stackrel{\text{tex}}{\rightarrow}$ "
Dedu_3(#1.
, #2.
, #3.
, #4.
)"]

[$\mathrm{Dedu}_3(*, *, *, *) \stackrel{\text{pyk}}{\rightarrow}$ "1deduction three " conclude " condition " bound " end 1deduction"]

$\mathrm{Dedu}_4(*, *, *, *)$

[$\mathrm{Dedu}_4(\mathsf{x}, \mathsf{y}, \mathsf{z}, \mathsf{u}) \stackrel{\text{tex}}{\rightarrow}$ "
Dedu_4(#1.
, #2.
, #3.
, #4.
)"]

[$\mathrm{Dedu}_4(*, *, *, *) \stackrel{\text{pyk}}{\rightarrow}$ "1deduction four " conclude " condition " bound " end 1deduction"]

$\mathrm{Dedu}_4^*(*, *, *, *)$

[$\mathrm{Dedu}_4^*(\mathsf{x}, \mathsf{y}, \mathsf{z}, \mathsf{u}) \stackrel{\text{tex}}{\rightarrow}$ "
Dedu_4^*(#1.
, #2.
, #3.
, #4.
)"]

[$\mathrm{Dedu}_4^*(*, *, *, *) \stackrel{\text{pyk}}{\rightarrow}$ "1deduction four star " conclude " condition " bound " end 1deduction"]

$\mathrm{Dedu}_5(*, *, *)$

[$\mathrm{Dedu}_5(\mathsf{x}, \mathsf{y}, \mathsf{z}) \stackrel{\text{tex}}{\rightarrow}$ "
Dedu_5(#1.
, #2.

, #3.
)"]

[$\mathrm{Dedu}_5(*, *, *) \stackrel{\mathrm{pyk}}{\to}$ "1deduction five " condition " bound " end 1deduction"]

$\mathrm{Dedu}_6(*, *, *, *)$

[$\mathrm{Dedu}_6(\mathsf{p}, \mathsf{c}, \mathsf{e}, \mathsf{b}) \stackrel{\mathrm{tex}}{\to}$ "
Dedu_6(#1.
, #2.
, #3.
, #4.
)"]

[$\mathrm{Dedu}_6(*, *, *, *) \stackrel{\mathrm{pyk}}{\to}$ "1deduction six " conclude " exception " bound " end 1deduction"]

$\mathrm{Dedu}_6^*(*, *, *, *)$

[$\mathrm{Dedu}_6^*(\mathsf{p}, \mathsf{c}, \mathsf{e}, \mathsf{b}) \stackrel{\mathrm{tex}}{\to}$ "
Dedu_6^*(#1.
, #2.
, #3.
, #4.
)"]

[$\mathrm{Dedu}_6^*(*, *, *, *) \stackrel{\mathrm{pyk}}{\to}$ "1deduction six star " conclude " exception " bound " end 1deduction"]

$\mathrm{Dedu}_7(*)$

[$\mathrm{Dedu}_7(\mathsf{p}) \stackrel{\mathrm{tex}}{\to}$ "
Dedu_7(#1.
)"]

[$\mathrm{Dedu}_7(*) \stackrel{\mathrm{pyk}}{\to}$ "1deduction seven " end 1deduction"]

$\mathrm{Dedu}_8(*, *)$

[$\mathrm{Dedu}_8(\mathsf{p}, \mathsf{b}) \stackrel{\mathrm{tex}}{\to}$ "
Dedu_8(#1.

, #2.
)”]

[$\mathrm{Dedu}_8(*, *) \stackrel{\text{pyk}}{\rightarrow}$ “1deduction eight " bound " end 1deduction”]

$\mathrm{Dedu}_8^*(*, *)$

[$\mathrm{Dedu}_8^*(\mathsf{p}, \mathsf{b}) \stackrel{\text{tex}}{\rightarrow}$ “
Dedu_8^*(#1.
, #2.
)”]

[$\mathrm{Dedu}_8^*(*, *) \stackrel{\text{pyk}}{\rightarrow}$ “1deduction eight star " bound " end 1deduction”]

Ex_1

[$\mathrm{Ex}_1 \stackrel{\text{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{Ex}_1 \ddot{=} \mathsf{a}_{\mathrm{Ex}}]\rceil)$]

[$\mathrm{Ex}_1 \stackrel{\text{tex}}{\rightarrow}$ “Ex_{1}”]

[$\mathrm{Ex}_1 \stackrel{\text{pyk}}{\rightarrow}$ “ex1”]

Ex_2

[$\mathrm{Ex}_2 \stackrel{\text{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{Ex}_2 \ddot{=} \mathsf{b}_{\mathrm{Ex}}]\rceil)$]

[$\mathrm{Ex}_2 \stackrel{\text{tex}}{\rightarrow}$ “Ex_{2}”]

[$\mathrm{Ex}_2 \stackrel{\text{pyk}}{\rightarrow}$ “ex2”]

Ex3

[$\mathrm{Ex3} \stackrel{\text{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{Ex3} \ddot{=} \mathsf{c}_{\mathrm{Ex}}]\rceil)$]

[$\mathrm{Ex3} \stackrel{\text{tex}}{\rightarrow}$ “Ex3”]

[$\mathrm{Ex3} \stackrel{\text{pyk}}{\rightarrow}$ “ex3”]

Ex_{10}

[$\mathrm{Ex}_{10} \stackrel{\text{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{Ex}_{10} \ddot{=} \mathsf{j}_{\mathrm{Ex}}]\rceil)$]

$[\mathrm{Ex}_{10} \stackrel{\mathrm{tex}}{\rightarrow}$ "Ex_{10}"]

$[\mathrm{Ex}_{10} \stackrel{\mathrm{pyk}}{\rightarrow}$ "ex10"]

Ex_{20}

$[\mathrm{Ex}_{20} \stackrel{\mathrm{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{Ex}_{20} \ddot{=} \mathsf{t}_{\mathrm{Ex}}]\rceil)]$

$[\mathrm{Ex}_{20} \stackrel{\mathrm{tex}}{\rightarrow}$ "Ex_{20}"]

$[\mathrm{Ex}_{20} \stackrel{\mathrm{pyk}}{\rightarrow}$ "ex20"]

$*_{\mathrm{Ex}}$

$[\mathsf{x}_{\mathrm{Ex}} \stackrel{\mathrm{tex}}{\rightarrow}$ "#1.
_{Ex}"]

$[*_{\mathrm{Ex}} \stackrel{\mathrm{pyk}}{\rightarrow}$ "existential var " end var"]

$*^{\mathrm{Ex}}$

$[\mathsf{x}^{\mathrm{Ex}} \stackrel{\mathrm{val}}{\rightarrow} \mathsf{x} \stackrel{\mathrm{r}}{=} \lceil \mathsf{x}_{\mathrm{Ex}} \rceil]$

$[\mathsf{x}^{\mathrm{Ex}} \stackrel{\mathrm{tex}}{\rightarrow}$ "#1.
^{Ex}"]

$[*^{\mathrm{Ex}} \stackrel{\mathrm{pyk}}{\rightarrow}$ "" is existential var"]

$\langle * \equiv * \mid * :== * \rangle_{\mathrm{Ex}}$

$[\langle \mathsf{a} \equiv \mathsf{b} | \mathsf{x} :== \mathsf{t} \rangle_{\mathrm{Ex}} \stackrel{\mathrm{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\langle \mathsf{a} \equiv \mathsf{b} | \mathsf{x} :== \mathsf{t} \rangle_{\mathrm{Ex}} \ddot{=} \langle \lceil \mathsf{a} \rceil \equiv^0 \lceil \mathsf{b} \rceil | \lceil \mathsf{x} \rceil :== \lceil \mathsf{t} \rceil \rangle_{\mathrm{Ex}}]\rceil)]$

$[\langle \mathsf{x} \equiv \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Ex}} \stackrel{\mathrm{tex}}{\rightarrow}$ "\langle #1.
{\equiv} #2.
| #3.
{:==} #4.
\rangle_{Ex} "]

$[\langle * \equiv * \mid * :== * \rangle_{\mathrm{Ex}} \stackrel{\mathrm{pyk}}{\rightarrow}$ "exist-sub " is " where " is " end sub"]

$\langle * \equiv^0 * \mid * :== * \rangle_{\mathrm{Ex}}$

$[\langle \mathsf{a} \equiv^0 \mathsf{b} | \mathsf{x} :== \mathsf{t} \rangle_{\mathrm{Ex}} \stackrel{\mathrm{val}}{\to} \lambda \mathsf{c}.\mathsf{x}^{\mathrm{Ex}} \wedge \langle \mathsf{a} \equiv^1 \mathsf{b} | \mathsf{x} :== \mathsf{t} \rangle_{\mathrm{Ex}}]$

$[\langle \mathsf{x} \equiv^0 \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Ex}} \stackrel{\mathrm{tex}}{\to}$ "\langle #1.
{\equiv}^0 #2.
| #3.
{:==} #4.
\rangle_{Ex} "]

$[\langle * \equiv^0 * \mid * :== * \rangle_{\mathrm{Ex}} \stackrel{\mathrm{pyk}}{\to}$ "exist-sub0 " is " where " is " end sub"]

$\langle * \equiv^1 * \mid * :== * \rangle_{\mathrm{Ex}}$

$[\langle \mathsf{a} \equiv^1 \mathsf{b} | \mathsf{x} :== \mathsf{t} \rangle_{\mathrm{Ex}} \stackrel{\mathrm{val}}{\to} \mathsf{a!x!t!}$
$\mathrm{If}(\mathsf{b} \stackrel{\mathrm{r}}{=} \lceil \forall_{\mathrm{obj}} \mathsf{u} \colon \mathsf{v} \rceil, \mathsf{F},$
$\mathrm{If}(\mathsf{b}^{\mathrm{Ex}} \wedge \mathsf{b} \stackrel{\mathrm{t}}{=} \mathsf{x}, \mathsf{a} \stackrel{\mathrm{t}}{=} \mathsf{t}, \mathrm{If}($
$\mathsf{a} \stackrel{\mathrm{r}}{=} \mathsf{b}, \langle \mathsf{a}^{\mathrm{t}} \equiv^* \mathsf{b}^{\mathrm{t}} | \mathsf{x} :== \mathsf{t} \rangle_{\mathrm{Ex}}, \mathsf{F})))]$

$[\langle \mathsf{x} \equiv^1 \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Ex}} \stackrel{\mathrm{tex}}{\to}$ "\langle #1.
{\equiv}^1 #2.
| #3.
{:==} #4.
\rangle_{Ex} "]

$[\langle * \equiv^1 * \mid * :== * \rangle_{\mathrm{Ex}} \stackrel{\mathrm{pyk}}{\to}$ "exist-sub1 " is " where " is " end sub"]

$\langle * \equiv^* * \mid * :== * \rangle_{\mathrm{Ex}}$

$[\langle \mathsf{a} \equiv^* \mathsf{b} | \mathsf{x} :== \mathsf{t} \rangle_{\mathrm{Ex}} \stackrel{\mathrm{val}}{\to} \mathsf{b!x!t!}\mathrm{If}(\mathsf{a}, \mathsf{T}, \mathrm{If}(\langle \mathsf{a}^{\mathrm{h}} \equiv^1 \mathsf{b}^{\mathrm{h}} | \mathsf{x} :== \mathsf{t} \rangle_{\mathrm{Ex}}, \langle \mathsf{a}^{\mathrm{t}} \equiv^* \mathsf{b}^{\mathrm{t}} | \mathsf{x} :== \mathsf{t} \rangle_{\mathrm{Ex}}, \mathsf{F}))]$

$[\langle \mathsf{x} \equiv^* \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Ex}} \stackrel{\mathrm{tex}}{\to}$ "\langle #1.
{\equiv}^* #2.
| #3.
{:==} #4.
\rangle_{Ex} "]

$[\langle * \equiv^* * \mid * :== * \rangle_{\mathrm{Ex}} \stackrel{\mathrm{pyk}}{\to}$ "exist-sub* " is " where " is " end sub"]

ph_1

$[\mathrm{ph}_1 \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [\mathrm{ph}_1 \stackrel{..}{=} \mathsf{a}_{\mathrm{Ph}}] \rceil)]$

$[\mathrm{ph}_1 \stackrel{\mathrm{tex}}{\to}$ “ph_{1}”]

$[\mathrm{ph}_1 \stackrel{\mathrm{pyk}}{\to}$ “ph1”]

ph_2

$[\mathrm{ph}_2 \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [\mathrm{ph}_2 \ddot{=} \mathsf{b}_{\mathrm{Ph}}] \rceil)]$

$[\mathrm{ph}_2 \stackrel{\mathrm{tex}}{\to}$ “ph_{2}”]

$[\mathrm{ph}_2 \stackrel{\mathrm{pyk}}{\to}$ “ph2”]

ph_3

$[\mathrm{ph}_3 \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [\mathrm{ph}_3 \ddot{=} \mathsf{c}_{\mathrm{Ph}}] \rceil)]$

$[\mathrm{ph}_3 \stackrel{\mathrm{tex}}{\to}$ “ph_{3}”]

$[\mathrm{ph}_3 \stackrel{\mathrm{pyk}}{\to}$ “ph3”]

$*_{\mathrm{Ph}}$

$[*_{\mathrm{Ph}} \stackrel{\mathrm{tex}}{\to}$ “#1.
_{Ph} ”]

$[*_{\mathrm{Ph}} \stackrel{\mathrm{pyk}}{\to}$ “placeholder-var " end var”]

$*^{\mathrm{Ph}}$

$[\mathsf{x}^{\mathrm{Ph}} \stackrel{\mathrm{tex}}{\to}$ “#1.
^{Ph}”]

$[*^{\mathrm{Ph}} \stackrel{\mathrm{pyk}}{\to}$ “" is placeholder-var”]

$\langle * \equiv * \mid * :== * \rangle_{\mathrm{Ph}}$

$[\langle \mathsf{x} \equiv \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Ph}} \stackrel{\mathrm{tex}}{\to}$ “\langle #1.
{\equiv} #2.
| #3.
{:==} #4.
\rangle_{Ph} ”]

$[\langle * \equiv * \,|\, * :== * \rangle_{\mathrm{Ph}} \overset{\mathrm{pyk}}{\to}$ "ph-sub " is " where " is " end sub"]

$\langle * \equiv^0 * \,|\, * :== * \rangle_{\mathrm{Ph}}$

$[\langle \mathsf{x} \equiv^0 \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Ph}} \overset{\mathrm{tex}}{\to}$ "\langle #1.
{\equiv}ˆ0 #2.
| #3.
{:==} #4.
\rangle_{Ph} "]

$[\langle * \equiv^0 * \,|\, * :== * \rangle_{\mathrm{Ph}} \overset{\mathrm{pyk}}{\to}$ "ph-sub0 " is " where " is " end sub"]

$\langle * \equiv^1 * \,|\, * :== * \rangle_{\mathrm{Ph}}$

$[\langle \mathsf{x} \equiv^1 \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Ph}} \overset{\mathrm{tex}}{\to}$ "\langle #1.
{\equiv}ˆ1 #2.
| #3.
{:==} #4.
\rangle_{Ph} "]

$[\langle * \equiv^1 * \,|\, * :== * \rangle_{\mathrm{Ph}} \overset{\mathrm{pyk}}{\to}$ "ph-sub1 " is " where " is " end sub"]

$\langle * \equiv^* * \,|\, * :== * \rangle_{\mathrm{Ph}}$

$[\langle \mathsf{x} \equiv^* \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Ph}} \overset{\mathrm{tex}}{\to}$ "\langle #1.
{\equiv}ˆ* #2.
| #3.
{:==} #4.
\rangle_{Ph} "]

$[\langle * \equiv^* * \,|\, * :== * \rangle_{\mathrm{Ph}} \overset{\mathrm{pyk}}{\to}$ "ph-sub* " is " where " is " end sub"]

$\langle * \equiv * \,|\, * :== * \rangle_{\mathrm{Me}}$

$[\langle \mathsf{x} \equiv \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Me}} \overset{\mathrm{tex}}{\to}$ "\langle #1.
{\equiv} #2.
| #3.
{:==} #4.
\rangle_{Me}"]

$[\langle * \equiv * \,|\, * :== * \rangle_{\mathrm{Me}} \overset{\mathrm{pyk}}{\to}$ "meta-sub " is " where " is " end sub"]

$\langle * \equiv^1 * \mid * :== * \rangle_{\mathrm{Me}}$

[$\langle \mathsf{x} \equiv^1 \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Me}} \stackrel{\mathrm{tex}}{\to}$ "\langle #1.
{\equiv}^1 #2.
| #3.
{:==} #4.
\rangle_{Me} "]

[$\langle * \equiv^1 * \mid * :== * \rangle_{\mathrm{Me}} \stackrel{\mathrm{pyk}}{\to}$ "meta-sub1 " is " where " is " end sub"]

$\langle * \equiv^* * \mid * :== * \rangle_{\mathrm{Me}}$

[$\langle \mathsf{x} \equiv^* \mathsf{y} | \mathsf{z} :== \mathsf{u} \rangle_{\mathrm{Me}} \stackrel{\mathrm{tex}}{\to}$ "\langle #1.
{\equiv}^* #2.
| #3.
{:==} #4.
\rangle_{Me} "]

[$\langle * \equiv^* * \mid * :== * \rangle_{\mathrm{Me}} \stackrel{\mathrm{pyk}}{\to}$ "meta-sub* " is " where " is " end sub"]

bs

[$\mathsf{bs} \stackrel{\mathrm{tex}}{\to}$ "\mathsf {bs}"]

[$\mathsf{bs} \stackrel{\mathrm{pyk}}{\to}$ "var big set"]

OBS

[$\mathsf{OBS} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [\mathsf{OBS} \doteq \overline{\mathsf{bs}}] \rceil)$]

[$\mathsf{OBS} \stackrel{\mathrm{tex}}{\to}$ " \mathsf {OBS}"]

[$\mathsf{OBS} \stackrel{\mathrm{pyk}}{\to}$ "object big set"]

$\mathcal{BS}$

[$\mathcal{BS} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [\mathcal{BS} \doteq \underline{\mathsf{bs}}] \rceil)$]

[$\mathcal{BS} \stackrel{\mathrm{tex}}{\to}$ "{\cal BS}"]

[$\mathcal{BS} \stackrel{\mathrm{pyk}}{\to}$ "meta big set"]

Ø

[Ø $\overset{\text{tex}}{\rightarrow}$ "\mathrm{\O}"]

[Ø $\overset{\text{pyk}}{\rightarrow}$ "zermelo empty set"]

SystemQ

[SystemQ $\overset{\text{stmt}}{\rightarrow}$ $\forall (fx)\colon \forall (fy)\colon \mathrm{R}((fx)) + +\mathrm{R}((fy)) == \mathrm{R}((fy)) + +\mathrm{R}((fx)) \oplus$
$\forall (fx)\colon \forall (fy)\colon \forall (fz)\colon \mathrm{R}((fx)) * *\mathrm{R}((fy)) * *\mathrm{R}((fz)) == \mathrm{R}((fx)) * *\mathrm{R}((fy)) * *\mathrm{R}((fz)) \oplus$
$\forall (fx)\colon \forall (rx)\colon \forall (ry)\colon (rx) == (ry) \vdash (fx) \in (rx) \vdash (fx) \in (ry) \oplus \forall \underline{m}\colon \mathrm{UB}(01//02 *$
$*xs[\underline{m}] + +us[\underline{m}], \mathrm{SetOfReals}) \vdash xs[(\underline{m} + 1)] == xs[\underline{m}] \oplus \forall \underline{x}\colon \forall \underline{y}\colon \underline{x} <= \underline{y} \Rightarrow \underline{y} <=$
$\underline{x} \Rightarrow \underline{x} = \underline{y} \oplus \forall \underline{s}\colon \forall \underline{x}\colon \forall \underline{y}\colon \dot{\neg}(\underline{s} \in \{\underline{x}, \underline{y}\} \Rightarrow \dot{\neg}(\underline{s}==\underline{x})n \Rightarrow \underline{s}==\underline{y} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{s}==$
$\underline{x})n \Rightarrow \underline{s}==\underline{y} \Rightarrow \underline{s} \in \{\underline{x}, \underline{y}\})n)n \oplus \forall \underline{m}\colon \forall \underline{n}\colon \underline{n} = 0 \vdash \mathrm{BS}(\underline{m}, \underline{n}) = \mathrm{rec}(1+1)(\exp)\underline{m} \oplus$
$\forall \underline{x}\colon (\underline{x} + 0) = \underline{x} \oplus \forall (fx)\colon \forall (fy)\colon \mathrm{R}((fx)) == \mathrm{R}((fy)) \vdash \mathrm{SF}((fx), (fy)) \oplus \forall \underline{x}\colon \forall \underline{y}\colon \underline{x} =$
$\underline{y} \Rightarrow \underline{x} <= \underline{y} \oplus \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \Rightarrow \underline{b} \vdash \underline{a} \vdash \underline{b} \oplus \forall (fx)\colon \forall (fy)\colon \forall (fz)\colon \mathrm{R}((fx)) = \mathrm{R}((fy)) \vdash$
$\mathrm{R}((fx)) + +\mathrm{R}((fz)) = \mathrm{R}((fy)) + +\mathrm{R}((fz)) \oplus \forall (fx)\colon \mathrm{R}((fx)) + +\mathrm{R}(0f) ==$
$\mathrm{R}((fx)) \oplus \forall \underline{x}\colon (\underline{x} * 1) = \underline{x} \oplus \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \vdash \underline{b} \oplus \forall (rx)\colon \forall (ry)\colon (rx) == (ry) \vdash (ry) ==$
$(rx) \oplus \forall \underline{m}\colon \forall \underline{x}\colon \underline{m} = 0 \vdash \underline{x}(\exp)\underline{m} = 1 \oplus \forall \underline{x}\colon \forall \underline{y}\colon \forall \underline{z}\colon 0 <= \underline{z} \Rightarrow \underline{x} <= \underline{y} \Rightarrow$
$(\underline{x} * \underline{z}) <= (\underline{y} * \underline{z}) \oplus \forall (fx)\colon \mathrm{R}((fx)) * *\mathrm{R}(1f) == \mathrm{R}((fx)) \oplus \dot{\neg}(0 = 1)n \oplus$
$\forall \underline{m}\colon \mathrm{Nat}(\underline{m}) \Vdash 0 <= \underline{m} \oplus \forall \underline{x}\colon \forall \underline{y}\colon \dot{\neg}(\underline{x}==\underline{y} \Rightarrow \forall_{\mathrm{obj}} \bar{s}\colon \dot{\neg}(\bar{s} \in \underline{x} \Rightarrow \bar{s} \in \underline{y} \Rightarrow \dot{\neg}(\bar{s} \in$
$\underline{y} \Rightarrow \bar{s} \in \underline{x})n)n \Rightarrow \dot{\neg}(\forall_{\mathrm{obj}} \bar{s}\colon \dot{\neg}(\bar{s} \in \underline{x} \Rightarrow \bar{s} \in \underline{y} \Rightarrow \dot{\neg}(\bar{s} \in \underline{y} \Rightarrow \bar{s} \in \underline{x})n)n \Rightarrow \underline{x}==$
$\underline{y})n)n \oplus \forall (rx)\colon \forall (ry)\colon \forall (rz)\colon (rx) == (ry) \vdash (ry) == (rz) \vdash (rx) == (rz) \oplus$
$\forall \underline{x}\colon \forall \underline{y}\colon (\underline{x} + \underline{y}) = (\underline{y} + \underline{x}) \oplus \forall \underline{m}\colon \forall (fx)\colon \forall (fy)\colon (fx) +_{\mathrm{f}} (fy)[\underline{m}] = ((fx)[\underline{m}] + (fy)[\underline{m}]) \oplus$
$\forall (v1)\colon \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \langle \underline{b} \equiv \underline{a} | (v1) \colon == 0 \rangle_{\mathrm{Me}} \Vdash \langle \underline{c} \equiv \underline{a} | (v1) \colon == ((v1) + 1) \rangle_{\mathrm{Me}} \Vdash \underline{b} \Rightarrow$
$\forall_{\mathrm{obj}} (v1)\colon \underline{a} \Rightarrow \underline{c} \Rightarrow \forall_{\mathrm{obj}} (v1)\colon \underline{a} \oplus \forall \underline{m}\colon \forall \underline{n}\colon \underline{n} = 0 \vdash \mathrm{UStelescope}(\underline{m}, \underline{n}) =$
$|(us[\underline{m}] + (-uus[(\underline{m} + 1)]))| \oplus \forall (fx)\colon \forall (fy)\colon \forall (fz)\colon \mathrm{R}((fx)) + +\mathrm{R}((fy)) + +\mathrm{R}((fz)) =$
$\mathrm{R}((fx)) + +\mathrm{R}((fy)) + +\mathrm{R}((fz)) \oplus \forall \underline{x}\colon \forall \underline{y}\colon (\underline{x} * \underline{y}) = (\underline{y} * \underline{x}) \oplus \forall (fx)\colon \forall (fy)\colon (fx) \in$
$\mathrm{R}((fy)) \vdash \mathrm{SF}((fx), (fy)) \oplus \forall \underline{x}\colon \forall \underline{y}\colon \forall \underline{z}\colon \underline{x} = \underline{y} \Rightarrow (\underline{x} * \underline{z}) = (\underline{y} * \underline{z}) \oplus \forall \underline{a}\colon \underline{a} \vdash \underline{a} \oplus$
$\forall \underline{m}\colon \mathrm{UB}(01//02 * *xs[\underline{m}] + +us[\underline{m}], \mathrm{SetOfReals}) \vdash us[(\underline{m} + 1)] ==$
$01//02 * *xs[\underline{m}] + +us[\underline{m}] \oplus \forall \underline{x}\colon \forall \underline{y}\colon \dot{\neg}(\underline{x} <= \underline{y})n \Rightarrow \underline{y} <= \underline{x} \oplus \forall \underline{s}\colon \forall \underline{x}\colon \dot{\neg}(\underline{s} \in$
$\mathrm{P}(\underline{x}) \Rightarrow \forall_{\mathrm{obj}} \bar{s}\colon \bar{s} \in \underline{s} \Rightarrow \bar{s} \in \underline{x} \Rightarrow \dot{\neg}(\forall_{\mathrm{obj}} \bar{s}\colon \bar{s} \in \underline{s} \Rightarrow \bar{s} \in \underline{x} \Rightarrow \underline{s} \in \mathrm{P}(\underline{x}))n)n \oplus$
$us[0] == xs[0] + +\mathrm{R}(1f) \oplus \forall \underline{x}\colon \underline{x} <= \underline{x} \oplus \forall \underline{s}\colon \dot{\neg}(\underline{s} \in \emptyset)n \oplus \forall \underline{x}\colon (\underline{x} + (-u\underline{x})) = 0 \oplus$
$\forall \underline{x}\colon \forall \underline{y}\colon \forall \underline{z}\colon \underline{x} = \underline{y} \Rightarrow \underline{x} = \underline{z} \Rightarrow \underline{y} = \underline{z} \oplus \forall \underline{m}\colon \forall \underline{n}\colon \dot{\neg}(0 <= \underline{n} \Rightarrow \dot{\neg}(\dot{\neg}(0 = \underline{n})n)n)n \vdash$
$\mathrm{UStelescope}(\underline{m}, \underline{n}) = (|(us[(\underline{m}+\underline{n})]+(-uus[(\underline{m}+(\underline{n}+1))]))|+\mathrm{UStelescope}(\underline{m}, (\underline{n}+$
$(-u1)))) \oplus \forall (fx)\colon \forall (fy)\colon \forall (fz)\colon \mathrm{R}((fx) +_{\mathrm{f}} (fy) +_{\mathrm{f}} (fz)) == \mathrm{R}((fx) +_{\mathrm{f}} (fy) +_{\mathrm{f}} (fz)) \oplus$
$\forall \underline{x}\colon \dot{\neg}(\underline{x} = 0)n \Rightarrow (\underline{x} * \mathrm{rec}\underline{x}) = 1 \oplus \forall \underline{a}\colon \forall \underline{b}\colon \dot{\neg}(\underline{b})n \Rightarrow \underline{a} \vdash \dot{\neg}(\underline{b})n \Rightarrow \dot{\neg}(\underline{a})n \vdash \underline{b} \oplus$
$\forall (rx)\colon (rx) == (rx) \oplus \forall \underline{m}\colon \dot{\neg}(\mathrm{UB}(01//02 * *xs[\underline{m}] + +us[\underline{m}], \mathrm{SetOfReals}))n \vdash$
$us[(\underline{m} + 1)] == us[\underline{m}] \oplus \forall \underline{x}\colon \forall \underline{y}\colon \forall \underline{z}\colon \underline{x} <= \underline{y} \Rightarrow (\underline{x} + \underline{z}) <= (\underline{y} + \underline{z}) \oplus$
$\forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{p}\colon \forall \underline{x}\colon \forall \underline{z}\colon \underline{p}^{\mathrm{Ph}} \wedge \langle \underline{b} \equiv \underline{a} | \underline{p} \colon == \underline{z} \rangle_{\mathrm{Ph}} \Vdash \dot{\neg}(\underline{z} \in \{ph \in \underline{x} \mid \underline{a}\} \Rightarrow \dot{\neg}(\underline{z} \in \underline{x} \Rightarrow$
$\dot{\neg}(\underline{b})n)n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{z} \in \underline{x} \Rightarrow \dot{\neg}(\underline{b})n)n \Rightarrow \underline{z} \in \{ph \in \underline{x} \mid \underline{a}\})n)n \oplus$
$\forall \underline{m}\colon \forall (fx)\colon \mathrm{R}((fx)) + +(- - \mathrm{R}((fx))) == \mathrm{R}(0f) \oplus \forall \underline{x}\colon \forall \underline{y}\colon \forall \underline{z}\colon (\underline{x} * (\underline{y} + \underline{z})) =$
$((\underline{x} * \underline{y}) + (\underline{x} * \underline{z})) \oplus \forall \underline{m}\colon \forall \underline{n}\colon \mathrm{Nat}(\underline{m}) \Vdash \mathrm{Nat}(\underline{n}) \Vdash \dot{\neg}(\underline{m} <= (\underline{n} + 1) \Rightarrow \dot{\neg}(\dot{\neg}(\underline{m} =$
$(\underline{n} + 1))n)n)n \vdash \underline{m} <= \underline{n} \oplus \forall \underline{x}\colon \forall \underline{t}\colon \forall \underline{a}\colon \forall \underline{b}\colon \langle \lceil \underline{a} \rceil \equiv^{0} \lceil \underline{b} \rceil | \lceil \underline{x} \rceil \colon == \lceil \underline{t} \rceil \rangle_{\mathrm{Ex}} \Vdash \underline{a} \vdash \underline{b} \oplus$

$\forall\underline{\mathsf{m}}\colon\forall\underline{\mathsf{x}}\colon\dot{\neg}(0 <= \underline{\mathsf{m}} \Rightarrow \dot{\neg}(\dot{\neg}(0 = \underline{\mathsf{m}})\mathrm{n})\mathrm{n})\mathrm{n} \vdash \underline{\mathsf{x}}(\mathrm{exp})\underline{\mathsf{m}} =$
$(\underline{\mathsf{x}} * \underline{\mathsf{x}}(\mathrm{exp})(\underline{\mathsf{m}} + (-\mathrm{u}1))) \oplus \forall\underline{\mathsf{x}}\colon\forall\underline{\mathsf{y}}\colon\forall\underline{\mathsf{z}}\colon((\underline{\mathsf{x}} + \underline{\mathsf{y}}) + \underline{\mathsf{z}}) = (\underline{\mathsf{x}} + (\underline{\mathsf{y}} + \underline{\mathsf{z}})) \oplus$
$\forall\underline{(\mathrm{v}1)}\colon\forall\underline{(\mathrm{v}2)}\colon\forall\underline{\mathsf{n}}\colon\forall\underline{(\epsilon)}\colon\forall\underline{(\mathrm{fx})}\colon\forall_{\mathrm{obj}}\underline{(\epsilon)}\colon\dot{\neg}(\forall_{\mathrm{obj}}\underline{\mathsf{n}}\colon\dot{\neg}(\forall_{\mathrm{obj}}\underline{(\mathrm{v}1)}\colon\forall_{\mathrm{obj}}\underline{(\mathrm{v}2)}\colon\dot{\neg}(0 <=$
$\underline{(\epsilon)} \Rightarrow \dot{\neg}(\dot{\neg}(0 = \underline{(\epsilon)})\mathrm{n})\mathrm{n})\mathrm{n} \Rightarrow \underline{\mathsf{n}} <= \underline{(\mathrm{v}1)} \Rightarrow \underline{\mathsf{n}} <= \underline{(\mathrm{v}2)} \Rightarrow$
$\dot{\neg}(|(\underline{(\mathrm{fx})}[\underline{(\mathrm{v}1)}] + (-\mathrm{u}\underline{(\mathrm{fx})}[\underline{(\mathrm{v}2)}]))| <= \underline{(\epsilon)} \Rightarrow \dot{\neg}(\dot{\neg}(|(\underline{(\mathrm{fx})}[\underline{(\mathrm{v}1)}] + (-\mathrm{u}\underline{(\mathrm{fx})}[\underline{(\mathrm{v}2)}]))| =$
$\underline{(\epsilon)})\mathrm{n})\mathrm{n})\mathrm{n})\mathrm{n})\mathrm{n} \oplus \forall\underline{\mathsf{x}}\colon\forall\underline{(\mathrm{v}1)}\colon\forall\underline{\mathsf{a}}\colon\forall\underline{\mathsf{b}}\colon\langle\underline{\mathsf{a}}\equiv\underline{\mathsf{b}}|\underline{(\mathrm{v}1)}{:}{==}\underline{\mathsf{x}}\rangle_{\mathrm{Me}} \Vdash \forall_{\mathrm{obj}}\underline{(\mathrm{v}1)}\colon\underline{\mathsf{b}} \Rightarrow \underline{\mathsf{a}} \oplus$
$\forall\underline{\mathsf{m}}\colon\forall\underline{\mathsf{n}}\colon\dot{\neg}(0 <= \underline{\mathsf{n}} \Rightarrow \dot{\neg}(\dot{\neg}(0 = \underline{\mathsf{n}})\mathrm{n})\mathrm{n})\mathrm{n} \vdash \mathrm{BS}(\underline{\mathsf{m}}, \underline{\mathsf{n}}) =$
$(\mathrm{rec}(1 + 1)(\mathrm{exp})(\underline{\mathsf{m}} + \underline{\mathsf{n}}) + \mathrm{BS}(\underline{\mathsf{m}}, (\underline{\mathsf{n}} + (-\mathrm{u}1)))) \oplus \forall\underline{\mathsf{x}}\colon\forall\underline{\mathsf{y}}\colon\forall\underline{\mathsf{z}}\colon((\underline{\mathsf{x}} * \underline{\mathsf{y}}) * \underline{\mathsf{z}}) =$
$(\underline{\mathsf{x}} * (\underline{\mathsf{y}} * \underline{\mathsf{z}})) \oplus \forall\underline{(\mathrm{fx})}\colon\forall\underline{(\mathrm{fy})}\colon\mathrm{SF}(\underline{(\mathrm{fx})}, \underline{(\mathrm{fy})}) \vdash \mathrm{R}(\underline{(\mathrm{fx})}) == \mathrm{R}(\underline{(\mathrm{fy})}) \oplus \forall\underline{\mathsf{x}}\colon\forall\underline{\mathsf{y}}\colon\forall\underline{\mathsf{z}}\colon\underline{\mathsf{x}} =$
$\underline{\mathsf{y}} \Rightarrow (\underline{\mathsf{x}} + \underline{\mathsf{z}}) = (\underline{\mathsf{y}} + \underline{\mathsf{z}}) \oplus \forall\underline{\mathsf{x}}\colon\forall\underline{\mathsf{a}}\colon\underline{\mathsf{a}} \vdash \forall_{\mathrm{obj}}\underline{\mathsf{x}}\colon\underline{\mathsf{a}} \oplus$
$\forall\underline{\mathsf{m}}\colon\dot{\neg}(\mathrm{UB}(01//02 * *\mathrm{xs}[\underline{\mathsf{m}}] + +\mathrm{us}[\underline{\mathsf{m}}], \mathrm{SetOfReals}))\mathrm{n} \vdash \mathrm{xs}[(\underline{\mathsf{m}} + 1)] ==$
$01//02 * *\mathrm{xs}[\underline{\mathsf{m}}] + +\mathrm{us}[\underline{\mathsf{m}}] \oplus \forall\underline{\mathsf{x}}\colon\forall\underline{\mathsf{y}}\colon\forall\underline{\mathsf{z}}\colon\underline{\mathsf{x}} <= \underline{\mathsf{y}} \Rightarrow \underline{\mathsf{y}} <= \underline{\mathsf{z}} \Rightarrow \underline{\mathsf{x}} <= \underline{\mathsf{z}} \oplus$
$\forall\underline{\mathsf{s}}\colon\forall\underline{\mathsf{x}}\colon\dot{\neg}(\underline{\mathsf{s}} \in \cup\underline{\mathsf{x}} \Rightarrow \dot{\neg}(\underline{\mathsf{s}} \in \mathsf{j}_{\mathrm{Ex}} \Rightarrow \dot{\neg}(\mathsf{j}_{\mathrm{Ex}} \in \underline{\mathsf{x}})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{s}} \in \mathsf{j}_{\mathrm{Ex}} \Rightarrow \dot{\neg}(\mathsf{j}_{\mathrm{Ex}} \in$
$\underline{\mathsf{x}})\mathrm{n})\mathrm{n} \Rightarrow \underline{\mathsf{s}} \in \cup\underline{\mathsf{x}})\mathrm{n})\mathrm{n} \oplus \forall\underline{(\mathrm{fx})}\colon\forall\underline{(\mathrm{fy})}\colon\mathrm{R}(\underline{(\mathrm{fx})}) * *\mathrm{R}(\underline{(\mathrm{fy})}) == \mathrm{R}(\underline{(\mathrm{fy})}) * *\mathrm{R}(\underline{(\mathrm{fx})}) \oplus$
$\forall\underline{(\mathrm{fx})}\colon\forall\underline{(\mathrm{rx})}\colon\forall\underline{(\mathrm{ry})}\colon\underline{(\mathrm{rx})} == \underline{(\mathrm{ry})} \vdash \underline{(\mathrm{fx})} \in \underline{(\mathrm{ry})} \vdash \underline{(\mathrm{fx})} \in \underline{(\mathrm{rx})}]$

[SystemQ $\stackrel{\mathrm{tex}}{\to}$ “SystemQ”]

[SystemQ $\stackrel{\mathrm{pyk}}{\to}$ “system Q”]

MP

[MP $\stackrel{\mathrm{proof}}{\to}$ Rule tactic]

[MP $\stackrel{\mathrm{stmt}}{\to}$ SystemQ $\vdash \forall\underline{\mathsf{a}}\colon\forall\underline{\mathsf{b}}\colon\underline{\mathsf{a}} \Rightarrow \underline{\mathsf{b}} \vdash \underline{\mathsf{a}} \vdash \underline{\mathsf{b}}$]

[MP $\stackrel{\mathrm{tex}}{\to}$ “MP”]

[MP $\stackrel{\mathrm{pyk}}{\to}$ “1rule mp”]

Gen

[Gen $\stackrel{\mathrm{proof}}{\to}$ Rule tactic]

[Gen $\stackrel{\mathrm{stmt}}{\to}$ SystemQ $\vdash \forall\underline{\mathsf{x}}\colon\forall\underline{\mathsf{a}}\colon\underline{\mathsf{a}} \vdash \forall_{\mathrm{obj}}\underline{\mathsf{x}}\colon\underline{\mathsf{a}}$]

[Gen $\stackrel{\mathrm{tex}}{\to}$ “Gen”]

[Gen $\stackrel{\mathrm{pyk}}{\to}$ “1rule gen”]

Repetition

[Repetition $\stackrel{\mathrm{proof}}{\to}$ Rule tactic]

[Repetition $\stackrel{\mathrm{stmt}}{\to}$ SystemQ $\vdash \forall\underline{\mathsf{a}}\colon\underline{\mathsf{a}} \vdash \underline{\mathsf{a}}$]

[Repetition $\stackrel{\text{tex}}{\rightarrow}$ “Repetition”]

[Repetition $\stackrel{\text{pyk}}{\rightarrow}$ “1rule repetition”]

Neg

[Neg $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[Neg $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon \dot{\neg}\,(\underline{b})\mathrm{n} \Rightarrow \underline{a} \vdash \dot{\neg}\,(\underline{b})\mathrm{n} \Rightarrow \dot{\neg}\,(\underline{a})\mathrm{n} \vdash \underline{b}$]

[Neg $\stackrel{\text{tex}}{\rightarrow}$ “Neg”]

[Neg $\stackrel{\text{pyk}}{\rightarrow}$ “1rule ad absurdum”]

Ded

[Ded $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[Ded $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \vdash \underline{b}$]

[Ded $\stackrel{\text{tex}}{\rightarrow}$ “Ded”]

[Ded $\stackrel{\text{pyk}}{\rightarrow}$ “1rule deduction”]

ExistIntro

[ExistIntro $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[ExistIntro $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \forall \underline{t}\colon \forall \underline{a}\colon \forall \underline{b}\colon \langle \lceil \underline{a} \rceil \equiv^0 \lceil \underline{b} \rceil \,|\, \lceil \underline{x} \rceil \colon == \lceil \underline{t} \rceil \rangle_{\mathrm{Ex}} \Vdash \underline{a} \vdash \underline{b}$]

[ExistIntro $\stackrel{\text{tex}}{\rightarrow}$ “ExistIntro”]

[ExistIntro $\stackrel{\text{pyk}}{\rightarrow}$ “1rule exist intro”]

Extensionality

[Extensionality $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[Extensionality $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \forall \underline{y}\colon \dot{\neg}\,(\underline{x} == \underline{y} \Rightarrow \forall_{\mathrm{obj}} \bar{s}\colon \dot{\neg}\,(\bar{s} \in \underline{x} \Rightarrow \bar{s} \in \underline{y} \Rightarrow \dot{\neg}\,(\bar{s} \in \underline{y} \Rightarrow \bar{s} \in \underline{x})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}\,(\forall_{\mathrm{obj}} \bar{s}\colon \dot{\neg}\,(\bar{s} \in \underline{x} \Rightarrow \bar{s} \in \underline{y} \Rightarrow \dot{\neg}\,(\bar{s} \in \underline{y} \Rightarrow \bar{s} \in \underline{x})\mathrm{n})\mathrm{n} \Rightarrow \underline{x} == \underline{y})\mathrm{n})\mathrm{n}$]

[Extensionality $\stackrel{\text{tex}}{\rightarrow}$ “Extensionality”]

[Extensionality $\stackrel{\text{pyk}}{\rightarrow}$ “axiom extensionality”]

Ødef

[Ødef $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[Ødef $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{s}\colon \dot{\neg}\, (\underline{s} \in \emptyset)$n]

[Ødef $\stackrel{\text{tex}}{\rightarrow}$ "\O{}def"]

[Ødef $\stackrel{\text{pyk}}{\rightarrow}$ "axiom empty set"]

PairDef

[PairDef $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[PairDef $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{s}\colon \forall \underline{x}\colon \forall \underline{y}\colon \dot{\neg}\, (\underline{s} \in \{\underline{x}, \underline{y}\} \Rightarrow \dot{\neg}\, (\underline{s} == \underline{x})\text{n} \Rightarrow \underline{s} == \underline{y} \Rightarrow$
$\dot{\neg}\, (\dot{\neg}\, (\underline{s} == \underline{x})\text{n} \Rightarrow \underline{s} == \underline{y} \Rightarrow \underline{s} \in \{\underline{x}, \underline{y}\})\text{n})\text{n}$]

[PairDef $\stackrel{\text{tex}}{\rightarrow}$ "PairDef"]

[PairDef $\stackrel{\text{pyk}}{\rightarrow}$ "axiom pair definition"]

UnionDef

[UnionDef $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[UnionDef $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{s}\colon \forall \underline{x}\colon \dot{\neg}\, (\underline{s} \in \cup \underline{x} \Rightarrow \dot{\neg}\, (\underline{s} \in j_{\text{Ex}} \Rightarrow \dot{\neg}\, (j_{\text{Ex}} \in \underline{x})\text{n})\text{n} \Rightarrow$
$\dot{\neg}\, (\dot{\neg}\, (\underline{s} \in j_{\text{Ex}} \Rightarrow \dot{\neg}\, (j_{\text{Ex}} \in \underline{x})\text{n})\text{n} \Rightarrow \underline{s} \in \cup \underline{x})\text{n})\text{n}$]

[UnionDef $\stackrel{\text{tex}}{\rightarrow}$ "UnionDef"]

[UnionDef $\stackrel{\text{pyk}}{\rightarrow}$ "axiom union definition"]

PowerDef

[PowerDef $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[PowerDef $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{s}\colon \forall \underline{x}\colon \dot{\neg}\, (\underline{s} \in \text{P}(\underline{x}) \Rightarrow \forall_{\text{obj}} \bar{s}\colon \bar{s} \in \underline{s} \Rightarrow \bar{s} \in \underline{x} \Rightarrow$
$\dot{\neg}\, (\forall_{\text{obj}} \bar{s}\colon \bar{s} \in \underline{s} \Rightarrow \bar{s} \in \underline{x} \Rightarrow \underline{s} \in \text{P}(\underline{x}))\text{n})\text{n}$]

[PowerDef $\stackrel{\text{tex}}{\rightarrow}$ "PowerDef"]

[PowerDef $\stackrel{\text{pyk}}{\rightarrow}$ "axiom power definition"]

SeparationDef

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

[SeparationDef $\overset{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{p}\colon \forall \underline{x}\colon \forall \underline{z}\colon \underline{p}^{\mathrm{Ph}} \wedge \langle \underline{b} \equiv \underline{a} | \underline{p} := = \underline{z} \rangle_{\mathrm{Ph}} \Vdash \dot{\neg}(\underline{z} \in \{\mathrm{ph} \in \underline{x} \mid \underline{a}\} \Rightarrow \dot{\neg}(\underline{z} \in \underline{x} \Rightarrow \dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{z} \in \underline{x} \Rightarrow \dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \Rightarrow \underline{z} \in \{\mathrm{ph} \in \underline{x} \mid \underline{a}\})\mathrm{n})\mathrm{n}$]

[SeparationDef $\overset{\text{tex}}{\rightarrow}$ "SeparationDef"]

[SeparationDef $\overset{\text{pyk}}{\rightarrow}$ "axiom separation definition"]

AddDoubleNeg

[AddDoubleNeg $\overset{\text{tex}}{\rightarrow}$ "AddDoubleNeg"]

[AddDoubleNeg $\overset{\text{pyk}}{\rightarrow}$ "prop lemma add double neg"]

RemoveDoubleNeg

[RemoveDoubleNeg $\overset{\text{tex}}{\rightarrow}$ "RemoveDoubleNeg"]

[RemoveDoubleNeg $\overset{\text{pyk}}{\rightarrow}$ "prop lemma remove double neg"]

AndCommutativity

[AndCommutativity $\overset{\text{tex}}{\rightarrow}$ "AndCommutativity"]

[AndCommutativity $\overset{\text{pyk}}{\rightarrow}$ "prop lemma and commutativity"]

AutoImply

[AutoImply $\overset{\text{tex}}{\rightarrow}$ "AutoImply"]

[AutoImply $\overset{\text{pyk}}{\rightarrow}$ "prop lemma auto imply"]

Contrapositive

[Contrapositive $\overset{\text{tex}}{\rightarrow}$ "Contrapositive"]

[Contrapositive $\overset{\text{pyk}}{\rightarrow}$ "prop lemma contrapositive"]

FirstConjunct

[FirstConjunct $\stackrel{\text{tex}}{\rightarrow}$ "FirstConjunct"]

[FirstConjunct $\stackrel{\text{pyk}}{\rightarrow}$ "prop lemma first conjunct"]

SecondConjunct

[SecondConjunct $\stackrel{\text{tex}}{\rightarrow}$ "SecondConjunct"]

[SecondConjunct $\stackrel{\text{pyk}}{\rightarrow}$ "prop lemma second conjunct"]

FromContradiction

[FromContradiction $\stackrel{\text{tex}}{\rightarrow}$ "FromContradiction"]

[FromContradiction $\stackrel{\text{pyk}}{\rightarrow}$ "prop lemma from contradiction"]

FromDisjuncts

[FromDisjuncts $\stackrel{\text{tex}}{\rightarrow}$ "FromDisjuncts"]

[FromDisjuncts $\stackrel{\text{pyk}}{\rightarrow}$ "prop lemma from disjuncts"]

IffCommutativity

[IffCommutativity $\stackrel{\text{tex}}{\rightarrow}$ "IffCommutativity"]

[IffCommutativity $\stackrel{\text{pyk}}{\rightarrow}$ "prop lemma iff commutativity"]

IffFirst

[IffFirst $\stackrel{\text{tex}}{\rightarrow}$ "IffFirst"]

[IffFirst $\stackrel{\text{pyk}}{\rightarrow}$ "prop lemma iff first"]

IffSecond

[IffSecond $\stackrel{\text{tex}}{\rightarrow}$ "IffSecond"]

[IffSecond $\stackrel{\text{pyk}}{\to}$ "prop lemma iff second"]

ImplyTransitivity

[ImplyTransitivity $\stackrel{\text{tex}}{\to}$ "ImplyTransitivity"]

[ImplyTransitivity $\stackrel{\text{pyk}}{\to}$ "prop lemma imply transitivity"]

JoinConjuncts

[JoinConjuncts $\stackrel{\text{tex}}{\to}$ "JoinConjuncts"]

[JoinConjuncts $\stackrel{\text{pyk}}{\to}$ "prop lemma join conjuncts"]

MP2

[MP2 $\stackrel{\text{tex}}{\to}$ "MP2"]

[MP2 $\stackrel{\text{pyk}}{\to}$ "prop lemma mp2"]

MP3

[MP3 $\stackrel{\text{tex}}{\to}$ "MP3"]

[MP3 $\stackrel{\text{pyk}}{\to}$ "prop lemma mp3"]

MP4

[MP4 $\stackrel{\text{tex}}{\to}$ "MP4"]

[MP4 $\stackrel{\text{pyk}}{\to}$ "prop lemma mp4"]

MP5

[MP5 $\stackrel{\text{tex}}{\to}$ "MP5"]

[MP5 $\stackrel{\text{pyk}}{\to}$ "prop lemma mp5"]

MT

[MT $\stackrel{\text{tex}}{\rightarrow}$ “MT”]

[MT $\stackrel{\text{pyk}}{\rightarrow}$ “prop lemma mt”]

NegativeMT

[NegativeMT $\stackrel{\text{tex}}{\rightarrow}$ “NegativeMT”]

[NegativeMT $\stackrel{\text{pyk}}{\rightarrow}$ “prop lemma negative mt”]

Technicality

[Technicality $\stackrel{\text{tex}}{\rightarrow}$ “Technicality”]

[Technicality $\stackrel{\text{pyk}}{\rightarrow}$ “prop lemma technicality”]

Weakening

[Weakening $\stackrel{\text{tex}}{\rightarrow}$ “Weakening”]

[Weakening $\stackrel{\text{pyk}}{\rightarrow}$ “prop lemma weakening”]

WeakenOr1

[WeakenOr1 $\stackrel{\text{tex}}{\rightarrow}$ “WeakenOr1”]

[WeakenOr1 $\stackrel{\text{pyk}}{\rightarrow}$ “prop lemma weaken or first”]

WeakenOr2

[WeakenOr2 $\stackrel{\text{tex}}{\rightarrow}$ “WeakenOr2”]

[WeakenOr2 $\stackrel{\text{pyk}}{\rightarrow}$ “prop lemma weaken or second”]

Formula2Pair

[Formula2Pair $\stackrel{\text{tex}}{\rightarrow}$ “Formula2Pair”]

[Formula2Pair $\overset{\text{pyk}}{\rightarrow}$ "lemma formula2pair"]

Pair2Formula

[Pair2Formula $\overset{\text{tex}}{\rightarrow}$ "Pair2Formula"]

[Pair2Formula $\overset{\text{pyk}}{\rightarrow}$ "lemma pair2formula"]

Formula2Union

[Formula2Union $\overset{\text{tex}}{\rightarrow}$ "Formula2Union"]

[Formula2Union $\overset{\text{pyk}}{\rightarrow}$ "lemma formula2union"]

Union2Formula

[Union2Formula $\overset{\text{tex}}{\rightarrow}$ "Union2Formula"]

[Union2Formula $\overset{\text{pyk}}{\rightarrow}$ "lemma union2formula"]

Formula2Sep

[Formula2Sep $\overset{\text{tex}}{\rightarrow}$ "Formula2Sep"]

[Formula2Sep $\overset{\text{pyk}}{\rightarrow}$ "lemma formula2separation"]

Sep2Formula

[Sep2Formula $\overset{\text{tex}}{\rightarrow}$ "Sep2Formula"]

[Sep2Formula $\overset{\text{pyk}}{\rightarrow}$ "lemma separation2formula"]

Formula2Power

[Formula2Power $\overset{\text{tex}}{\rightarrow}$ "Formula2Power"]

[Formula2Power $\overset{\text{pyk}}{\rightarrow}$ "lemma formula2power"]

SubsetInPower

[SubsetInPower $\stackrel{\text{tex}}{\rightarrow}$ "SubsetInPower"]

[SubsetInPower $\stackrel{\text{pyk}}{\rightarrow}$ "lemma subset in power set"]

HelperPowerIsSub

[HelperPowerIsSub $\stackrel{\text{tex}}{\rightarrow}$ "HelperPowerIsSub"]

[HelperPowerIsSub $\stackrel{\text{pyk}}{\rightarrow}$ "lemma power set is subset0"]

PowerIsSub

[PowerIsSub $\stackrel{\text{tex}}{\rightarrow}$ "PowerIsSub"]

[PowerIsSub $\stackrel{\text{pyk}}{\rightarrow}$ "lemma power set is subset"]

(Switch)HelperPowerIsSub

[(Switch)HelperPowerIsSub $\stackrel{\text{tex}}{\rightarrow}$ "(Switch)HelperPowerIsSub"]

[(Switch)HelperPowerIsSub $\stackrel{\text{pyk}}{\rightarrow}$ "lemma power set is subset0-switch"]

(Switch)PowerIsSub

[(Switch)PowerIsSub $\stackrel{\text{tex}}{\rightarrow}$ "(Switch)PowerIsSub"]

[(Switch)PowerIsSub $\stackrel{\text{pyk}}{\rightarrow}$ "lemma power set is subset-switch"]

ToSetEquality

[ToSetEquality $\stackrel{\text{tex}}{\rightarrow}$ "ToSetEquality"]

[ToSetEquality $\stackrel{\text{pyk}}{\rightarrow}$ "lemma set equality suff condition"]

HelperToSetEquality(t)

[HelperToSetEquality(t) $\stackrel{\text{tex}}{\rightarrow}$ "HelperToSetEquality(t)"]

[HelperToSetEquality(t) $\stackrel{\text{pyk}}{\to}$ "lemma set equality suff condition(t)0"]

ToSetEquality(t)

[ToSetEquality(t) $\stackrel{\text{tex}}{\to}$ "ToSetEquality(t)"]

[ToSetEquality(t) $\stackrel{\text{pyk}}{\to}$ "lemma set equality suff condition(t)"]

HelperFromSetEquality

[HelperFromSetEquality $\stackrel{\text{tex}}{\to}$ "HelperFromSetEquality"]

[HelperFromSetEquality $\stackrel{\text{pyk}}{\to}$ "lemma set equality skip quantifier"]

FromSetEquality

[FromSetEquality $\stackrel{\text{tex}}{\to}$ "FromSetEquality"]

[FromSetEquality $\stackrel{\text{pyk}}{\to}$ "lemma set equality nec condition"]

HelperReflexivity

[HelperReflexivity $\stackrel{\text{tex}}{\to}$ "HelperReflexivity"]

[HelperReflexivity $\stackrel{\text{pyk}}{\to}$ "lemma reflexivity0"]

Reflexivity

[Reflexivity $\stackrel{\text{tex}}{\to}$ "Reflexivity"]

[Reflexivity $\stackrel{\text{pyk}}{\to}$ "lemma reflexivity"]

HelperSymmetry

[HelperSymmetry $\stackrel{\text{tex}}{\to}$ "HelperSymmetry"]

[HelperSymmetry $\stackrel{\text{pyk}}{\to}$ "lemma symmetry0"]

Symmetry

[Symmetry $\stackrel{\text{tex}}{\to}$ “Symmetry”]

[Symmetry $\stackrel{\text{pyk}}{\to}$ “lemma symmetry”]

HelperTransitivity

[HelperTransitivity $\stackrel{\text{tex}}{\to}$ “HelperTransitivity”]

[HelperTransitivity $\stackrel{\text{pyk}}{\to}$ “lemma transitivity0”]

Transitivity

[Transitivity $\stackrel{\text{tex}}{\to}$ “Transitivity”]

[Transitivity $\stackrel{\text{pyk}}{\to}$ “lemma transitivity”]

ERisReflexive

[ERisReflexive $\stackrel{\text{tex}}{\to}$ “ERisReflexive”]

[ERisReflexive $\stackrel{\text{pyk}}{\to}$ “lemma er is reflexive”]

ERisSymmetric

[ERisSymmetric $\stackrel{\text{tex}}{\to}$ “ERisSymmetric”]

[ERisSymmetric $\stackrel{\text{pyk}}{\to}$ “lemma er is symmetric”]

ERisTransitive

[ERisTransitive $\stackrel{\text{tex}}{\to}$ “ERisTransitive”]

[ERisTransitive $\stackrel{\text{pyk}}{\to}$ “lemma er is transitive”]

ØisSubset

[ØisSubset $\stackrel{\text{tex}}{\to}$ “\O{}isSubset”]

[∅isSubset $\stackrel{\text{pyk}}{\rightarrow}$ “lemma empty set is subset”]

HelperMemberNot∅

[HelperMemberNot∅ $\stackrel{\text{tex}}{\rightarrow}$ “HelperMemberNot\O{}”]

[HelperMemberNot∅ $\stackrel{\text{pyk}}{\rightarrow}$ “lemma member not empty0”]

MemberNot∅

[MemberNot∅ $\stackrel{\text{tex}}{\rightarrow}$ “MemberNot\O{}”]

[MemberNot∅ $\stackrel{\text{pyk}}{\rightarrow}$ “lemma member not empty”]

HelperUnique∅

[HelperUnique∅ $\stackrel{\text{tex}}{\rightarrow}$ “HelperUnique\O{}”]

[HelperUnique∅ $\stackrel{\text{pyk}}{\rightarrow}$ “lemma unique empty set0”]

Unique∅

[Unique∅ $\stackrel{\text{tex}}{\rightarrow}$ “Unique\O{}”]

[Unique∅ $\stackrel{\text{pyk}}{\rightarrow}$ “lemma unique empty set”]

==Reflexivity

[==Reflexivity $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[==Reflexivity $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(rx)}\colon \underline{(rx)} == \underline{(rx)}$]

[==Reflexivity $\stackrel{\text{tex}}{\rightarrow}$ “==\!{}Reflexivity”]

[==Reflexivity $\stackrel{\text{pyk}}{\rightarrow}$ “lemma ==Reflexivity”]

==Symmetry

[==Symmetry $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[==Symmetry $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(rx)}\colon \forall \underline{(ry)}\colon \underline{(rx)} == \underline{(ry)} \vdash \underline{(ry)} == \underline{(rx)}$]

[==Symmetry $\stackrel{\text{tex}}{\rightarrow}$ "==\!{}Symmetry"]

[==Symmetry $\stackrel{\text{pyk}}{\rightarrow}$ "lemma ==Symmetry"]

Helper==Transitivity

[Helper==Transitivity $\stackrel{\text{tex}}{\rightarrow}$ "Helper\!{}==\!{}Transitivity"]

[Helper==Transitivity $\stackrel{\text{pyk}}{\rightarrow}$ "lemma ==Transitivity0"]

==Transitivity

[==Transitivity $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[==Transitivity $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(rx)}\colon \forall \underline{(ry)}\colon \forall \underline{(rz)}\colon \underline{(rx)} == \underline{(ry)} \vdash \underline{(ry)} == \underline{(rz)} \vdash \underline{(rx)} == \underline{(rz)}$]

[==Transitivity $\stackrel{\text{tex}}{\rightarrow}$ "\!{}==\!{}Transitivity"]

[==Transitivity $\stackrel{\text{pyk}}{\rightarrow}$ "lemma ==Transitivity"]

HelperTransferNotEq

[HelperTransferNotEq $\stackrel{\text{tex}}{\rightarrow}$ "HelperTransferNotEq"]

[HelperTransferNotEq $\stackrel{\text{pyk}}{\rightarrow}$ "lemma transfer ˜is0"]

TransferNotEq

[TransferNotEq $\stackrel{\text{tex}}{\rightarrow}$ "TransferNotEq"]

[TransferNotEq $\stackrel{\text{pyk}}{\rightarrow}$ "lemma transfer ˜is"]

HelperPairSubset

[HelperPairSubset $\stackrel{\text{tex}}{\rightarrow}$ "HelperPairSubset"]

[HelperPairSubset $\stackrel{\text{pyk}}{\rightarrow}$ "lemma pair subset0"]

Helper(2)PairSubset

[Helper(2)PairSubset $\stackrel{\text{tex}}{\to}$ "Helper(2)PairSubset"]

[Helper(2)PairSubset $\stackrel{\text{pyk}}{\to}$ "lemma pair subset1"]

PairSubset

[PairSubset $\stackrel{\text{tex}}{\to}$ "PairSubset"]

[PairSubset $\stackrel{\text{pyk}}{\to}$ "lemma pair subset"]

SamePair

[SamePair $\stackrel{\text{tex}}{\to}$ "SamePair"]

[SamePair $\stackrel{\text{pyk}}{\to}$ "lemma same pair"]

SameSingleton

[SameSingleton $\stackrel{\text{tex}}{\to}$ "SameSingleton"]

[SameSingleton $\stackrel{\text{pyk}}{\to}$ "lemma same singleton"]

UnionSubset

[UnionSubset $\stackrel{\text{tex}}{\to}$ "UnionSubset"]

[UnionSubset $\stackrel{\text{pyk}}{\to}$ "lemma union subset"]

SameUnion

[SameUnion $\stackrel{\text{tex}}{\to}$ "SameUnion"]

[SameUnion $\stackrel{\text{pyk}}{\to}$ "lemma same union"]

SeparationSubset

[SeparationSubset $\stackrel{\text{tex}}{\to}$ "SeparationSubset"]

[SeparationSubset $\overset{\text{pyk}}{\rightarrow}$ "lemma separation subset"]

SameSeparation

[SameSeparation $\overset{\text{tex}}{\rightarrow}$ "SameSeparation"]

[SameSeparation $\overset{\text{pyk}}{\rightarrow}$ "lemma same separation"]

SameBinaryUnion

[SameBinaryUnion $\overset{\text{tex}}{\rightarrow}$ "SameBinaryUnion"]

[SameBinaryUnion $\overset{\text{pyk}}{\rightarrow}$ "lemma same binary union"]

IntersectionSubset

[IntersectionSubset $\overset{\text{tex}}{\rightarrow}$ "IntersectionSubset"]

[IntersectionSubset $\overset{\text{pyk}}{\rightarrow}$ "lemma intersection subset"]

SameIntersection

[SameIntersection $\overset{\text{tex}}{\rightarrow}$ "SameIntersection"]

[SameIntersection $\overset{\text{pyk}}{\rightarrow}$ "lemma same intersection"]

AutoMember

[AutoMember $\overset{\text{tex}}{\rightarrow}$ "AutoMember"]

[AutoMember $\overset{\text{pyk}}{\rightarrow}$ "lemma auto member"]

HelperEqSysNot∅

[HelperEqSysNot∅ $\overset{\text{tex}}{\rightarrow}$ "HelperEqSysNot\O{}"]

[HelperEqSysNot∅ $\overset{\text{pyk}}{\rightarrow}$ "lemma eq-system not empty0"]

EqSysNot∅

[EqSysNot∅ $\stackrel{\text{tex}}{\to}$ "EqSysNot\O{}"]

[EqSysNot∅ $\stackrel{\text{pyk}}{\to}$ "lemma eq-system not empty"]

HelperEqSubset

[HelperEqSubset $\stackrel{\text{tex}}{\to}$ "HelperEqSubset"]

[HelperEqSubset $\stackrel{\text{pyk}}{\to}$ "lemma eq subset0"]

EqSubset

[EqSubset $\stackrel{\text{tex}}{\to}$ "EqSubset"]

[EqSubset $\stackrel{\text{pyk}}{\to}$ "lemma eq subset"]

HelperEqNecessary

[HelperEqNecessary $\stackrel{\text{tex}}{\to}$ "HelperEqNecessary"]

[HelperEqNecessary $\stackrel{\text{pyk}}{\to}$ "lemma equivalence nec condition0"]

EqNecessary

[EqNecessary $\stackrel{\text{tex}}{\to}$ "EqNecessary"]

[EqNecessary $\stackrel{\text{pyk}}{\to}$ "lemma equivalence nec condition"]

HelperNoneEqNecessary

[HelperNoneEqNecessary $\stackrel{\text{tex}}{\to}$ "HelperNoneEqNecessary"]

[HelperNoneEqNecessary $\stackrel{\text{pyk}}{\to}$ "lemma none-equivalence nec condition0"]

Helper(2)NoneEqNecessary

[Helper(2)NoneEqNecessary $\stackrel{\text{tex}}{\rightarrow}$ “Helper(2)NoneEqNecessary”]

[Helper(2)NoneEqNecessary $\stackrel{\text{pyk}}{\rightarrow}$ “lemma none-equivalence nec condition1”]

NoneEqNecessary

[NoneEqNecessary $\stackrel{\text{tex}}{\rightarrow}$ “NoneEqNecessary”]

[NoneEqNecessary $\stackrel{\text{pyk}}{\rightarrow}$ “lemma none-equivalence nec condition”]

EqClassIsSubset

[EqClassIsSubset $\stackrel{\text{tex}}{\rightarrow}$ “EqClassIsSubset”]

[EqClassIsSubset $\stackrel{\text{pyk}}{\rightarrow}$ “lemma equivalence class is subset”]

EqClassesAreDisjoint

[EqClassesAreDisjoint $\stackrel{\text{tex}}{\rightarrow}$ “EqClassesAreDisjoint”]

[EqClassesAreDisjoint $\stackrel{\text{pyk}}{\rightarrow}$ “lemma equivalence classes are disjoint”]

AllDisjoint

[AllDisjoint $\stackrel{\text{tex}}{\rightarrow}$ “AllDisjoint”]

[AllDisjoint $\stackrel{\text{pyk}}{\rightarrow}$ “lemma all disjoint”]

AllDisjointImply

[AllDisjointImply $\stackrel{\text{tex}}{\rightarrow}$ “AllDisjointImply”]

[AllDisjointImply $\stackrel{\text{pyk}}{\rightarrow}$ “lemma all disjoint-imply”]

BSsubset

[BSsubset $\stackrel{\text{tex}}{\rightarrow}$ “BSsubset”]

[BSsubset $\stackrel{\text{pyk}}{\rightarrow}$ "lemma bs subset union(bs/r)"]

Union(BS/R)subset

[Union(BS/R)subset $\stackrel{\text{tex}}{\rightarrow}$ "Union(BS/R)subset"]

[Union(BS/R)subset $\stackrel{\text{pyk}}{\rightarrow}$ "lemma union(bs/r) subset bs"]

UnionIdentity

[UnionIdentity $\stackrel{\text{tex}}{\rightarrow}$ "UnionIdentity"]

[UnionIdentity $\stackrel{\text{pyk}}{\rightarrow}$ "lemma union(bs/r) is bs"]

EqSysIsPartition

[EqSysIsPartition $\stackrel{\text{tex}}{\rightarrow}$ "EqSysIsPartition"]

[EqSysIsPartition $\stackrel{\text{pyk}}{\rightarrow}$ "theorem eq-system is partition"]

(x1)

[(x1) $\stackrel{\text{tex}}{\rightarrow}$ "(x1)"]

[(x1) $\stackrel{\text{pyk}}{\rightarrow}$ "var x1"]

(x2)

[(x2) $\stackrel{\text{tex}}{\rightarrow}$ "(x2)"]

[(x2) $\stackrel{\text{pyk}}{\rightarrow}$ "var x2"]

(y1)

[(y1) $\stackrel{\text{tex}}{\rightarrow}$ "(y1)"]

[(y1) $\stackrel{\text{pyk}}{\rightarrow}$ "var y1"]

(y2)

$[(y2) \stackrel{\text{tex}}{\to}$ "(y2)"]

$[(y2) \stackrel{\text{pyk}}{\to}$ "var y2"]

(v1)

$[(v1) \stackrel{\text{tex}}{\to}$ "(v1)"]

$[(v1) \stackrel{\text{pyk}}{\to}$ "var v1"]

(v2)

$[(v2) \stackrel{\text{tex}}{\to}$ "(v2)"]

$[(v2) \stackrel{\text{pyk}}{\to}$ "var v2"]

(v3)

$[(v3) \stackrel{\text{tex}}{\to}$ "(v3)"]

$[(v3) \stackrel{\text{pyk}}{\to}$ "var v3"]

(v4)

$[(v4) \stackrel{\text{tex}}{\to}$ "(v4)"]

$[(v4) \stackrel{\text{pyk}}{\to}$ "var v4"]

(v2n)

$[(v2n) \stackrel{\text{tex}}{\to}$ "(v2n)"]

$[(v2n) \stackrel{\text{pyk}}{\to}$ "var v2n"]

(m1)

[(m1) $\stackrel{\text{tex}}{\rightarrow}$ "(m1)"]

[(m1) $\stackrel{\text{pyk}}{\rightarrow}$ "var m1"]

(m2)

[(m2) $\stackrel{\text{tex}}{\rightarrow}$ "(m2)"]

[(m2) $\stackrel{\text{pyk}}{\rightarrow}$ "var m2"]

(n1)

[(n1) $\stackrel{\text{tex}}{\rightarrow}$ "(n1)"]

[(n1) $\stackrel{\text{pyk}}{\rightarrow}$ "var n1"]

(n2)

[(n2) $\stackrel{\text{tex}}{\rightarrow}$ "(n2)"]

[(n2) $\stackrel{\text{pyk}}{\rightarrow}$ "var n2"]

(n3)

[(n3) $\stackrel{\text{tex}}{\rightarrow}$ "(n3)"]

[(n3) $\stackrel{\text{pyk}}{\rightarrow}$ "var n3"]

(ϵ)

[(ϵ) $\stackrel{\text{tex}}{\rightarrow}$ "(\epsilon)"]

[(ϵ) $\stackrel{\text{pyk}}{\rightarrow}$ "var ep"]

$(\epsilon)_1$

$[(\epsilon)_1 \stackrel{\text{tex}}{\rightarrow}$ "(\epsilon)_{1}"]

$[(\epsilon)_1 \stackrel{\text{pyk}}{\rightarrow}$ "var ep1"]

$(\epsilon 2)$

$[(\epsilon 2) \stackrel{\text{tex}}{\rightarrow}$ "(\epsilon 2)"]

$[(\epsilon 2) \stackrel{\text{pyk}}{\rightarrow}$ "var ep2"]

(fep)

[(fep) $\stackrel{\text{tex}}{\rightarrow}$ "(fep)"]

[(fep) $\stackrel{\text{pyk}}{\rightarrow}$ "var fep"]

(fx)

[(fx) $\stackrel{\text{tex}}{\rightarrow}$ "(fx)"]

[(fx) $\stackrel{\text{pyk}}{\rightarrow}$ "var fx"]

(fy)

[(fy) $\stackrel{\text{tex}}{\rightarrow}$ "(fy)"]

[(fy) $\stackrel{\text{pyk}}{\rightarrow}$ "var fy"]

(fz)

[(fz) $\stackrel{\text{tex}}{\rightarrow}$ "(fz)"]

[(fz) $\stackrel{\text{pyk}}{\rightarrow}$ "var fz"]

(fu)

$[(fu) \stackrel{\text{tex}}{\rightarrow}$ "(fu)"$]$

$[(fu) \stackrel{\text{pyk}}{\rightarrow}$ "var fu"$]$

(fv)

$[(fv) \stackrel{\text{tex}}{\rightarrow}$ "(fv)"$]$

$[(fv) \stackrel{\text{pyk}}{\rightarrow}$ "var fv"$]$

(fw)

$[(fw) \stackrel{\text{tex}}{\rightarrow}$ "(fw)"$]$

$[(fw) \stackrel{\text{pyk}}{\rightarrow}$ "var fw"$]$

(rx)

$[(rx) \stackrel{\text{tex}}{\rightarrow}$ "(rx)"$]$

$[(rx) \stackrel{\text{pyk}}{\rightarrow}$ "var rx"$]$

(ry)

$[(ry) \stackrel{\text{tex}}{\rightarrow}$ "(ry)"$]$

$[(ry) \stackrel{\text{pyk}}{\rightarrow}$ "var ry"$]$

(rz)

$[(rz) \stackrel{\text{tex}}{\rightarrow}$ "(rz)"$]$

$[(rz) \stackrel{\text{pyk}}{\rightarrow}$ "var rz"$]$

(ru)

$[(ru) \stackrel{\text{tex}}{\to} \text{“(ru)”}]$

$[(ru) \stackrel{\text{pyk}}{\to} \text{“var ru”}]$

(sx)

$[(sx) \stackrel{\text{tex}}{\to} \text{“(sx)”}]$

$[(sx) \stackrel{\text{pyk}}{\to} \text{“var sx”}]$

(sx1)

$[(sx1) \stackrel{\text{tex}}{\to} \text{“(sx1)”}]$

$[(sx1) \stackrel{\text{pyk}}{\to} \text{“var sx1”}]$

(sy)

$[(sy) \stackrel{\text{tex}}{\to} \text{“(sy)”}]$

$[(sy) \stackrel{\text{pyk}}{\to} \text{“var sy”}]$

(sy1)

$[(sy1) \stackrel{\text{tex}}{\to} \text{“(sy1)”}]$

$[(sy1) \stackrel{\text{pyk}}{\to} \text{“var sy1”}]$

(sz)

$[(sz) \stackrel{\text{tex}}{\to} \text{“(sz)”}]$

$[(sz) \stackrel{\text{pyk}}{\to} \text{“var sz”}]$

(sz1)

[(sz1) $\stackrel{\text{tex}}{\to}$ "(sz1)"]

[(sz1) $\stackrel{\text{pyk}}{\to}$ "var sz1"]

(su)

[(su) $\stackrel{\text{tex}}{\to}$ "(su)"]

[(su) $\stackrel{\text{pyk}}{\to}$ "var su"]

(su1)

[(su1) $\stackrel{\text{tex}}{\to}$ "(su1)"]

[(su1) $\stackrel{\text{pyk}}{\to}$ "var su1"]

(fxs)

[(fxs) $\stackrel{\text{tex}}{\to}$ "(fxs)"]

[(fxs) $\stackrel{\text{pyk}}{\to}$ "var fxs"]

(fys)

[(fys) $\stackrel{\text{tex}}{\to}$ "(fys)"]

[(fys) $\stackrel{\text{pyk}}{\to}$ "var fys"]

(crs1)

[(crs1) $\stackrel{\text{tex}}{\to}$ "(crs1)"]

[(crs1) $\stackrel{\text{pyk}}{\to}$ "var crs1"]

(f1)

[(f1) $\stackrel{\text{tex}}{\to}$ "(f1)"]

[(f1) $\stackrel{\text{pyk}}{\to}$ "var f1"]

(f2)

[(f2) $\stackrel{\text{tex}}{\to}$ "(f2)"]

[(f2) $\stackrel{\text{pyk}}{\to}$ "var f2"]

(f3)

[(f3) $\stackrel{\text{tex}}{\to}$ "(f3)"]

[(f3) $\stackrel{\text{pyk}}{\to}$ "var f3"]

(f4)

[(f4) $\stackrel{\text{tex}}{\to}$ "(f4)"]

[(f4) $\stackrel{\text{pyk}}{\to}$ "var f4"]

(op1)

[(op1) $\stackrel{\text{tex}}{\to}$ "(op1)"]

[(op1) $\stackrel{\text{pyk}}{\to}$ "var op1"]

(op2)

[(op2) $\stackrel{\text{tex}}{\to}$ "(op2)"]

[(op2) $\stackrel{\text{pyk}}{\to}$ "var op2"]

(r1)

$[(r1) \stackrel{\text{tex}}{\to} \text{“(r1)”}]$

$[(r1) \stackrel{\text{pyk}}{\to} \text{“var r1”}]$

(s1)

$[(s1) \stackrel{\text{tex}}{\to} \text{“(s1)”}]$

$[(s1) \stackrel{\text{pyk}}{\to} \text{“var s1”}]$

(s2)

$[(s2) \stackrel{\text{tex}}{\to} \text{“(s2)”}]$

$[(s2) \stackrel{\text{pyk}}{\to} \text{“var s2”}]$

X_1

$[X_1 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [X_1 \ddot{=} \underline{(x1)}] \rceil)]$

$[X_1 \stackrel{\text{tex}}{\to} \text{“X\_\{1\}”}]$

$[X_1 \stackrel{\text{pyk}}{\to} \text{“meta x1”}]$

X_2

$[X_2 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [X_2 \ddot{=} \underline{(x2)}] \rceil)]$

$[X_2 \stackrel{\text{tex}}{\to} \text{“X\_\{2\}”}]$

$[X_2 \stackrel{\text{pyk}}{\to} \text{“meta x2”}]$

Y_1

$[Y_1 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [Y_1 \ddot{=} \underline{(y1)}] \rceil)]$

$[Y_1 \stackrel{\text{tex}}{\to} \text{“Y\_\{1\}”}]$

$[Y_1 \stackrel{\text{pyk}}{\to} \text{“meta y1”}]$

Y_2

$[\mathrm{Y}_2 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{Y}_2 \ddot{=} \underline{(\mathrm{y2})}]\rceil)]$

$[\mathrm{Y}_2 \stackrel{\text{tex}}{\to}$ "Y_{2}"]

$[\mathrm{Y}_2 \stackrel{\text{pyk}}{\to}$ "meta y2"]

V_1

$[\mathrm{V}_1 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{V}_1 \ddot{=} \underline{(\mathrm{v1})}]\rceil)]$

$[\mathrm{V}_1 \stackrel{\text{tex}}{\to}$ "V_{1}"]

$[\mathrm{V}_1 \stackrel{\text{pyk}}{\to}$ "meta v1"]

V_2

$[\mathrm{V}_2 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{V}_2 \ddot{=} \underline{(\mathrm{v2})}]\rceil)]$

$[\mathrm{V}_2 \stackrel{\text{tex}}{\to}$ "V_{2}"]

$[\mathrm{V}_2 \stackrel{\text{pyk}}{\to}$ "meta v2"]

V_3

$[\mathrm{V}_3 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{V}_3 \ddot{=} \underline{(\mathrm{v3})}]\rceil)]$

$[\mathrm{V}_3 \stackrel{\text{tex}}{\to}$ "V_{3}"]

$[\mathrm{V}_3 \stackrel{\text{pyk}}{\to}$ "meta v3"]

V_4

$[\mathrm{V}_4 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{V}_4 \ddot{=} \underline{(\mathrm{v4})}]\rceil)]$

$[\mathrm{V}_4 \stackrel{\text{tex}}{\to}$ "V_{4}"]

$[\mathrm{V}_4 \stackrel{\text{pyk}}{\to}$ "meta v4"]

V_{2n}

$[\mathrm{V}_{2n} \stackrel{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{V}_{2n} \ddot{=} \underline{(\mathrm{v2n})}]\rceil)]$

$[\mathrm{V}_{2n} \stackrel{\text{tex}}{\to}$ “V_{2n}”]

$[\mathrm{V}_{2n} \stackrel{\text{pyk}}{\to}$ “meta v2n”]

M_1

$[\mathrm{M}_1 \stackrel{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{M}_1 \ddot{=} \underline{(\mathrm{m1})}]\rceil)]$

$[\mathrm{M}_1 \stackrel{\text{tex}}{\to}$ “M_{1}”]

$[\mathrm{M}_1 \stackrel{\text{pyk}}{\to}$ “meta m1”]

M_2

$[\mathrm{M}_2 \stackrel{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{M}_2 \ddot{=} \underline{(\mathrm{m2})}]\rceil)]$

$[\mathrm{M}_2 \stackrel{\text{tex}}{\to}$ “M_{2}”]

$[\mathrm{M}_2 \stackrel{\text{pyk}}{\to}$ “meta m2”]

N_1

$[\mathrm{N}_1 \stackrel{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{N}_1 \ddot{=} \underline{(\mathrm{n1})}]\rceil)]$

$[\mathrm{N}_1 \stackrel{\text{tex}}{\to}$ “N_{1} ”]

$[\mathrm{N}_1 \stackrel{\text{pyk}}{\to}$ “meta n1”]

N_2

$[\mathrm{N}_2 \stackrel{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{N}_2 \ddot{=} \underline{(\mathrm{n2})}]\rceil)]$

$[\mathrm{N}_2 \stackrel{\text{tex}}{\to}$ “N_{2} ”]

$[\mathrm{N}_2 \stackrel{\text{pyk}}{\to}$ “meta n2”]

N_3

$[\mathrm{N}_3 \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{N}_3 \ddot{=} \underline{(\mathrm{n3})}]\rceil)]$

$[\mathrm{N}_3 \stackrel{\mathrm{tex}}{\to}$ "N_{3} "]

$[\mathrm{N}_3 \stackrel{\mathrm{pyk}}{\to}$ "meta n3"]

ϵ

$[\epsilon \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\epsilon \ddot{=} \underline{(\epsilon)}]\rceil)]$

$[\epsilon \stackrel{\mathrm{tex}}{\to}$ "\epsilon"]

$[\epsilon \stackrel{\mathrm{pyk}}{\to}$ "meta ep"]

$\epsilon 1$

$[\epsilon 1 \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\epsilon 1 \ddot{=} \underline{(\epsilon)_1}]\rceil)]$

$[\epsilon 1 \stackrel{\mathrm{tex}}{\to}$ "\epsilon 1"]

$[\epsilon 1 \stackrel{\mathrm{pyk}}{\to}$ "meta ep1"]

$\epsilon 2$

$[\epsilon 2 \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\epsilon 2 \ddot{=} \underline{(\epsilon 2)}]\rceil)]$

$[\epsilon 2 \stackrel{\mathrm{tex}}{\to}$ "\epsilon 2"]

$[\epsilon 2 \stackrel{\mathrm{pyk}}{\to}$ "meta ep2"]

FX

$[\mathrm{FX} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{FX} \ddot{=} \underline{(\mathrm{fx})}]\rceil)]$

$[\mathrm{FX} \stackrel{\mathrm{tex}}{\to}$ "FX"]

$[\mathrm{FX} \stackrel{\mathrm{pyk}}{\to}$ "meta fx"]

FY

$[\mathrm{FY} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{FY} \ddot{=} \underline{(\mathrm{fy})}]\rceil)]$

$[\mathrm{FY} \stackrel{\mathrm{tex}}{\to} \text{“FY”}]$

$[\mathrm{FY} \stackrel{\mathrm{pyk}}{\to} \text{“meta fy”}]$

FZ

$[\mathrm{FZ} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{FZ} \ddot{=} \underline{(\mathrm{fz})}]\rceil)]$

$[\mathrm{FZ} \stackrel{\mathrm{tex}}{\to} \text{“FZ”}]$

$[\mathrm{FZ} \stackrel{\mathrm{pyk}}{\to} \text{“meta fz”}]$

FU

$[\mathrm{FU} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{FU} \ddot{=} \underline{(\mathrm{fu})}]\rceil)]$

$[\mathrm{FU} \stackrel{\mathrm{tex}}{\to} \text{“FU”}]$

$[\mathrm{FU} \stackrel{\mathrm{pyk}}{\to} \text{“meta fu”}]$

FV

$[\mathrm{FV} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{FV} \ddot{=} \underline{(\mathrm{fv})}]\rceil)]$

$[\mathrm{FV} \stackrel{\mathrm{tex}}{\to} \text{“FV”}]$

$[\mathrm{FV} \stackrel{\mathrm{pyk}}{\to} \text{“meta fv”}]$

FW

$[\mathrm{FW} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{FW} \ddot{=} \underline{(\mathrm{fw})}]\rceil)]$

$[\mathrm{FW} \stackrel{\mathrm{tex}}{\to} \text{“FW”}]$

$[\mathrm{FW} \stackrel{\mathrm{pyk}}{\to} \text{“meta fw”}]$

FEP

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

$[\mathrm{FEP} \overset{\mathrm{tex}}{\to}$ "FEP"$]$

$[\mathrm{FEP} \overset{\mathrm{pyk}}{\to}$ "meta fep"$]$

RX

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

$[\mathrm{RX} \overset{\mathrm{tex}}{\to}$ "RX"$]$

$[\mathrm{RX} \overset{\mathrm{pyk}}{\to}$ "meta rx"$]$

RY

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

$[\mathrm{RY} \overset{\mathrm{tex}}{\to}$ "RY"$]$

$[\mathrm{RY} \overset{\mathrm{pyk}}{\to}$ "meta ry"$]$

RZ

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

$[\mathrm{RZ} \overset{\mathrm{tex}}{\to}$ "RZ"$]$

$[\mathrm{RZ} \overset{\mathrm{pyk}}{\to}$ "meta rz"$]$

RU

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

$[\mathrm{RU} \overset{\mathrm{tex}}{\to}$ "RU"$]$

$[\mathrm{RU} \overset{\mathrm{pyk}}{\to}$ "meta ru"$]$

(SX)

$[(\mathrm{SX}) \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{SX}) \ddot{=} \underline{(\mathrm{sx})}]\rceil)]$

$[(\mathrm{SX}) \stackrel{\text{tex}}{\to}$ "(SX)"$]$

$[(\mathrm{SX}) \stackrel{\text{pyk}}{\to}$ "meta sx"$]$

(SX1)

$[(\mathrm{SX1}) \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{SX1}) \ddot{=} \underline{(\mathrm{sx1})}]\rceil)]$

$[(\mathrm{SX1}) \stackrel{\text{tex}}{\to}$ "(SX1)"$]$

$[(\mathrm{SX1}) \stackrel{\text{pyk}}{\to}$ "meta sx1"$]$

(SY)

$[(\mathrm{SY}) \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{SY}) \ddot{=} \underline{(\mathrm{sy})}]\rceil)]$

$[(\mathrm{SY}) \stackrel{\text{tex}}{\to}$ "(SY)"$]$

$[(\mathrm{SY}) \stackrel{\text{pyk}}{\to}$ "meta sy"$]$

(SY1)

$[(\mathrm{SY1}) \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{SY1}) \ddot{=} \underline{(\mathrm{sy1})}]\rceil)]$

$[(\mathrm{SY1}) \stackrel{\text{tex}}{\to}$ "(SY1)"$]$

$[(\mathrm{SY1}) \stackrel{\text{pyk}}{\to}$ "meta sy1"$]$

(SZ)

$[(\mathrm{SZ}) \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{SZ}) \ddot{=} \underline{(\mathrm{sz})}]\rceil)]$

$[(\mathrm{SZ}) \stackrel{\text{tex}}{\to}$ "(SZ)"$]$

$[(\mathrm{SZ}) \stackrel{\text{pyk}}{\to}$ "meta sz"$]$

(SZ1)

$[(\mathrm{SZ1}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{SZ1}) \doteqdot \underline{(\mathrm{sz1})}]\rceil)]$

$[(\mathrm{SZ1}) \stackrel{\mathrm{tex}}{\to}$ "(SZ1)"$]$

$[(\mathrm{SZ1}) \stackrel{\mathrm{pyk}}{\to}$ "meta sz1"$]$

(SU)

$[(\mathrm{SU}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{SU}) \doteqdot \underline{(\mathrm{su})}]\rceil)]$

$[(\mathrm{SU}) \stackrel{\mathrm{tex}}{\to}$ "(SU)"$]$

$[(\mathrm{SU}) \stackrel{\mathrm{pyk}}{\to}$ "meta su"$]$

(SU1)

$[(\mathrm{SU1}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{SU1}) \doteqdot \underline{(\mathrm{su1})}]\rceil)]$

$[(\mathrm{SU1}) \stackrel{\mathrm{tex}}{\to}$ "(SU1)"$]$

$[(\mathrm{SU1}) \stackrel{\mathrm{pyk}}{\to}$ "meta su1"$]$

FXS

$[\mathrm{FXS} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{FXS} \doteqdot \underline{(\mathrm{fxs})}]\rceil)]$

$[\mathrm{FXS} \stackrel{\mathrm{tex}}{\to}$ "FXS"$]$

$[\mathrm{FXS} \stackrel{\mathrm{pyk}}{\to}$ "meta fxs"$]$

FYS

$[\mathrm{FYS} \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{FYS} \doteqdot \underline{(\mathrm{fys})}]\rceil)]$

$[\mathrm{FYS} \stackrel{\mathrm{tex}}{\to}$ "FYS"$]$

$[\mathrm{FYS} \stackrel{\mathrm{pyk}}{\to}$ "meta fys"$]$

(F1)

$[(\mathrm{F1}) \stackrel{\mathrm{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{F1}) \ddot{=} \underline{(\mathrm{f1})}]\rceil)]$

$[(\mathrm{F1}) \stackrel{\mathrm{tex}}{\rightarrow}$ “(F1)”]

$[(\mathrm{F1}) \stackrel{\mathrm{pyk}}{\rightarrow}$ “meta f1”]

(F2)

$[(\mathrm{F2}) \stackrel{\mathrm{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{F2}) \ddot{=} \underline{(\mathrm{f2})}]\rceil)]$

$[(\mathrm{F2}) \stackrel{\mathrm{tex}}{\rightarrow}$ “(F2)”]

$[(\mathrm{F2}) \stackrel{\mathrm{pyk}}{\rightarrow}$ “meta f2”]

(F3)

$[(\mathrm{F3}) \stackrel{\mathrm{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{F3}) \ddot{=} \underline{(\mathrm{f3})}]\rceil)]$

$[(\mathrm{F3}) \stackrel{\mathrm{tex}}{\rightarrow}$ “(F3)”]

$[(\mathrm{F3}) \stackrel{\mathrm{pyk}}{\rightarrow}$ “meta f3”]

(F4)

$[(\mathrm{F4}) \stackrel{\mathrm{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{F4}) \ddot{=} \underline{(\mathrm{f4})}]\rceil)]$

$[(\mathrm{F4}) \stackrel{\mathrm{tex}}{\rightarrow}$ “(F4)”]

$[(\mathrm{F4}) \stackrel{\mathrm{pyk}}{\rightarrow}$ “meta f4”]

(OP1)

$[(\mathrm{OP1}) \stackrel{\mathrm{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{OP1}) \ddot{=} \underline{(\mathrm{op1})}]\rceil)]$

$[(\mathrm{OP1}) \stackrel{\mathrm{tex}}{\rightarrow}$ “(OP1)”]

$[(\mathrm{OP1}) \stackrel{\mathrm{pyk}}{\rightarrow}$ “meta op1”]

(OP2)

$[(\mathrm{OP2}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{OP2}) \ddot{=} \underline{(\mathrm{op2})}]\rceil)]$

$[(\mathrm{OP2}) \stackrel{\mathrm{tex}}{\to}$ "(OP2)"$]$

$[(\mathrm{OP2}) \stackrel{\mathrm{pyk}}{\to}$ "meta op2"$]$

(R1)

$[(\mathrm{R1}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{R1}) \ddot{=} \underline{(\mathrm{r1})}]\rceil)]$

$[(\mathrm{R1}) \stackrel{\mathrm{tex}}{\to}$ "(R1)"$]$

$[(\mathrm{R1}) \stackrel{\mathrm{pyk}}{\to}$ "meta r1"$]$

(S1)

$[(\mathrm{S1}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{S1}) \ddot{=} \underline{(\mathrm{s1})}]\rceil)]$

$[(\mathrm{S1}) \stackrel{\mathrm{tex}}{\to}$ "(S1)"$]$

$[(\mathrm{S1}) \stackrel{\mathrm{pyk}}{\to}$ "meta s1"$]$

(S2)

$[(\mathrm{S2}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{S2}) \ddot{=} \underline{(\mathrm{s2})}]\rceil)]$

$[(\mathrm{S2}) \stackrel{\mathrm{tex}}{\to}$ "(S2)"$]$

$[(\mathrm{S2}) \stackrel{\mathrm{pyk}}{\to}$ "meta s2"$]$

(EPob)

$[(\mathrm{EPob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{EPob}) \ddot{=} \overline{(\epsilon)}]\rceil)]$

$[(\mathrm{EPob}) \stackrel{\mathrm{tex}}{\to}$ "(EPob)"$]$

$[(\mathrm{EPob}) \stackrel{\mathrm{pyk}}{\to}$ "object ep"$]$

(CRS1ob)

$[(\mathrm{CRS1ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{CRS1ob}) \doteq \overline{(\mathrm{crs1})}]\rceil)]$

$[(\mathrm{CRS1ob}) \stackrel{\mathrm{tex}}{\to}$ "(CRS1ob)"$]$

$[(\mathrm{CRS1ob}) \stackrel{\mathrm{pyk}}{\to}$ "object crs1"$]$

(F1ob)

$[(\mathrm{F1ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{F1ob}) \doteq \overline{(\mathrm{f1})}]\rceil)]$

$[(\mathrm{F1ob}) \stackrel{\mathrm{tex}}{\to}$ "(F1ob)"$]$

$[(\mathrm{F1ob}) \stackrel{\mathrm{pyk}}{\to}$ "object f1"$]$

(F2ob)

$[(\mathrm{F2ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{F2ob}) \doteq \overline{(\mathrm{f2})}]\rceil)]$

$[(\mathrm{F2ob}) \stackrel{\mathrm{tex}}{\to}$ "(F2ob)"$]$

$[(\mathrm{F2ob}) \stackrel{\mathrm{pyk}}{\to}$ "object f2"$]$

(F3ob)

$[(\mathrm{F3ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{F3ob}) \doteq \overline{(\mathrm{f3})}]\rceil)]$

$[(\mathrm{F3ob}) \stackrel{\mathrm{tex}}{\to}$ "(F3ob)"$]$

$[(\mathrm{F3ob}) \stackrel{\mathrm{pyk}}{\to}$ "object f3"$]$

(F4ob)

$[(\mathrm{F4ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{F4ob}) \doteq \overline{(\mathrm{f4})}]\rceil)]$

$[(\mathrm{F4ob}) \stackrel{\mathrm{tex}}{\to}$ "(F4ob)"$]$

$[(\mathrm{F4ob}) \stackrel{\mathrm{pyk}}{\to}$ "object f4"$]$

(N1ob)

$[(\mathrm{N1ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{N1ob}) \ddot{=} \overline{(\mathrm{n1})}]\rceil)]$

$[(\mathrm{N1ob}) \stackrel{\mathrm{tex}}{\to}$ "(N1ob)"]

$[(\mathrm{N1ob}) \stackrel{\mathrm{pyk}}{\to}$ "object n1"]

(N2ob)

$[(\mathrm{N2ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{N2ob}) \ddot{=} \overline{(\mathrm{n2})}]\rceil)]$

$[(\mathrm{N2ob}) \stackrel{\mathrm{tex}}{\to}$ "(N2ob)"]

$[(\mathrm{N2ob}) \stackrel{\mathrm{pyk}}{\to}$ "object n2"]

(OP1ob)

$[(\mathrm{OP1ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{OP1ob}) \ddot{=} \overline{(\mathrm{op1})}]\rceil)]$

$[(\mathrm{OP1ob}) \stackrel{\mathrm{tex}}{\to}$ "(OP1ob)"]

$[(\mathrm{OP1ob}) \stackrel{\mathrm{pyk}}{\to}$ "object op1"]

(OP2ob)

$[(\mathrm{OP2ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{OP2ob}) \ddot{=} \overline{(\mathrm{op2})}]\rceil)]$

$[(\mathrm{OP2ob}) \stackrel{\mathrm{tex}}{\to}$ "(OP2ob)"]

$[(\mathrm{OP2ob}) \stackrel{\mathrm{pyk}}{\to}$ "object op2"]

(R1ob)

$[(\mathrm{R1ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{R1ob}) \ddot{=} \overline{(\mathrm{r1})}]\rceil)]$

$[(\mathrm{R1ob}) \stackrel{\mathrm{tex}}{\to}$ "(R1ob)"]

$[(\mathrm{R1ob}) \stackrel{\mathrm{pyk}}{\to}$ "object r1"]

(S1ob)

$[(\mathrm{S1ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{S1ob}) \ddot{=} \overline{(\mathrm{s1})}]\rceil)]$

$[(\mathrm{S1ob}) \stackrel{\mathrm{tex}}{\to}$ "(S1ob)"]

$[(\mathrm{S1ob}) \stackrel{\mathrm{pyk}}{\to}$ "object s1"]

(S2ob)

$[(\mathrm{S2ob}) \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{S2ob}) \ddot{=} \overline{(\mathrm{s2})}]\rceil)]$

$[(\mathrm{S2ob}) \stackrel{\mathrm{tex}}{\to}$ "(S2ob)"]

$[(\mathrm{S2ob}) \stackrel{\mathrm{pyk}}{\to}$ "object s2"]

ph_4

$[\mathrm{ph}_4 \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{ph}_4 \ddot{=} \mathsf{d}_{\mathrm{Ph}}]\rceil)]$

$[\mathrm{ph}_4 \stackrel{\mathrm{tex}}{\to}$ "ph_{4}"]

$[\mathrm{ph}_4 \stackrel{\mathrm{pyk}}{\to}$ "ph4"]

ph_5

$[\mathrm{ph}_5 \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{ph}_5 \ddot{=} \mathsf{e}_{\mathrm{Ph}}]\rceil)]$

$[\mathrm{ph}_5 \stackrel{\mathrm{tex}}{\to}$ "ph_{5}"]

$[\mathrm{ph}_5 \stackrel{\mathrm{pyk}}{\to}$ "ph5"]

ph_6

$[\mathrm{ph}_6 \stackrel{\mathrm{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathrm{ph}_6 \ddot{=} \mathsf{f}_{\mathrm{Ph}}]\rceil)]$

$[\mathrm{ph}_6 \stackrel{\mathrm{tex}}{\to}$ "ph_{6}"]

$[\mathrm{ph}_6 \stackrel{\mathrm{pyk}}{\to}$ "ph6"]

NAT

[NAT $\stackrel{\text{tex}}{\rightarrow}$ "NAT"]

[NAT $\stackrel{\text{pyk}}{\rightarrow}$ "NAT"]

RATIONAL$_\text{S}$ERIES

[RATIONAL$_\text{S}$ERIES $\stackrel{\text{tex}}{\rightarrow}$ "RATIONAL_SERIES"]

[RATIONAL$_\text{S}$ERIES $\stackrel{\text{pyk}}{\rightarrow}$ "RATIONAL_SERIES"]

SERIES

[SERIES $\stackrel{\text{tex}}{\rightarrow}$ "SERIES"]

[SERIES $\stackrel{\text{pyk}}{\rightarrow}$ "SERIES"]

SetOfReals

[SetOfReals $\stackrel{\text{tex}}{\rightarrow}$ "SetOfReals"]

[SetOfReals $\stackrel{\text{pyk}}{\rightarrow}$ "setOfReals"]

SetOfFxs

[SetOfFxs $\stackrel{\text{tex}}{\rightarrow}$ "SetOfFxs"]

[SetOfFxs $\stackrel{\text{pyk}}{\rightarrow}$ "setOfFxs"]

N

[N $\stackrel{\text{tex}}{\rightarrow}$ "N"]

[N $\stackrel{\text{pyk}}{\rightarrow}$ "N"]

Q

[Q $\stackrel{\text{tex}}{\rightarrow}$ "Q"]

$[Q \stackrel{pyk}{\rightarrow} \text{“Q”}]$

X

$[X \stackrel{tex}{\rightarrow} \text{“X”}]$

$[X \stackrel{pyk}{\rightarrow} \text{“X”}]$

xs

$[xs \stackrel{tex}{\rightarrow} \text{“xs”}]$

$[xs \stackrel{pyk}{\rightarrow} \text{“xs”}]$

xaF

$[xaF \stackrel{tex}{\rightarrow} \text{“xaF”}]$

$[xaF \stackrel{pyk}{\rightarrow} \text{“xsF”}]$

ysF

$[ysF \stackrel{tex}{\rightarrow} \text{“ysF”}]$

$[ysF \stackrel{pyk}{\rightarrow} \text{“ysF”}]$

us

$[us \stackrel{tex}{\rightarrow} \text{“us”}]$

$[us \stackrel{pyk}{\rightarrow} \text{“us”}]$

usFoelge

$[usFoelge \stackrel{tex}{\rightarrow} \text{“usFoelge”}]$

$[usFoelge \stackrel{pyk}{\rightarrow} \text{“usF”}]$

0

$[0 \stackrel{\text{tex}}{\to} \text{“0”}]$

$[0 \stackrel{\text{pyk}}{\to} \text{“0”}]$

1

$[1 \stackrel{\text{tex}}{\to} \text{“1”}]$

$[1 \stackrel{\text{pyk}}{\to} \text{“1”}]$

(-1)

$[(-1) \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[(-1) \ddot{=} (-\text{u}1)]\rceil)]$

$[(-1) \stackrel{\text{tex}}{\to} \text{“(-1)”}]$

$[(-1) \stackrel{\text{pyk}}{\to} \text{“(-1)”}]$

2

$[2 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[2 \ddot{=} (1 + 1)]\rceil)]$

$[2 \stackrel{\text{tex}}{\to} \text{“2”}]$

$[2 \stackrel{\text{pyk}}{\to} \text{“2”}]$

3

$[3 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[3 \ddot{=} (2 + 1)]\rceil)]$

$[3 \stackrel{\text{tex}}{\to} \text{“3”}]$

$[3 \stackrel{\text{pyk}}{\to} \text{“3”}]$

$1/2$

$[1/2 \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[1/2 \ddot{=} \text{rec2}]\rceil)]$

$[1/2 \stackrel{\text{tex}}{\to} \text{“1/2”}]$

$[1/2 \stackrel{\text{pyk}}{\to} \text{“1/2”}]$

1/3

$[1/3 \overset{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[1/3 \ddot{=} \mathrm{rec3}]\rceil)]$

$[1/3 \overset{\text{tex}}{\to} \text{“1/3”}]$

$[1/3 \overset{\text{pyk}}{\to} \text{“1/3”}]$

2/3

$[2/3 \overset{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[2/3 \ddot{=} (2 * 1/3)]\rceil)]$

$[2/3 \overset{\text{tex}}{\to} \text{“2/3”}]$

$[2/3 \overset{\text{pyk}}{\to} \text{“2/3”}]$

0f

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

$[0\mathrm{f} \overset{\text{pyk}}{\to} \text{“0f”}]$

1f

$[1\mathrm{f} \overset{\text{pyk}}{\to} \text{“1f”}]$

00

$[00 \overset{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[00 \ddot{=} \mathrm{R}(0\mathrm{f})]\rceil)]$

$[00 \overset{\text{tex}}{\to} \text{“00”}]$

$[00 \overset{\text{pyk}}{\to} \text{“00”}]$

01

$[01 \overset{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[01 \ddot{=} \mathrm{R}(1\mathrm{f})]\rceil)]$

$[01 \overset{\text{pyk}}{\to} \text{“01”}]$

$(--01)$

$[(--01) \stackrel{\text{tex}}{\rightarrow}$ "(--01)"]

$[(--01) \stackrel{\text{pyk}}{\rightarrow}$ "(--01)"]

02

$[02 \stackrel{\text{tex}}{\rightarrow}$ "02"]

$[02 \stackrel{\text{pyk}}{\rightarrow}$ "02"]

01//02

$[01//02 \stackrel{\text{tex}}{\rightarrow}$ "01//02"]

$[01//02 \stackrel{\text{pyk}}{\rightarrow}$ "01//02"]

PlusAssociativity(R)

[PlusAssociativity(R) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[PlusAssociativity(R) $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash$
$\forall \underline{(\mathrm{fx})}\colon \forall \underline{(\mathrm{fy})}\colon \forall \underline{(\mathrm{fz})}\colon \mathrm{R}(\underline{(\mathrm{fx})}){+}{+}\mathrm{R}(\underline{(\mathrm{fy})}){+}{+}\mathrm{R}(\underline{(\mathrm{fz})}) = \mathrm{R}(\underline{(\mathrm{fx})}){+}{+}\mathrm{R}(\underline{(\mathrm{fy})}){+}{+}\mathrm{R}(\underline{(\mathrm{fz})})$]

[PlusAssociativity(R) $\stackrel{\text{tex}}{\rightarrow}$ "PlusAssociativity(R)"]

[PlusAssociativity(R) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma plusAssociativity(R)"]

PlusAssociativity(R)XX

[PlusAssociativity(R)XX $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[PlusAssociativity(R)XX $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash$
$\forall \underline{(\mathrm{fx})}\colon \forall \underline{(\mathrm{fy})}\colon \forall \underline{(\mathrm{fz})}\colon \mathrm{R}(\underline{(\mathrm{fx})} +_{\mathrm{f}} \underline{(\mathrm{fy})} +_{\mathrm{f}} \underline{(\mathrm{fz})}) == \mathrm{R}(\underline{(\mathrm{fx})} +_{\mathrm{f}} \underline{(\mathrm{fy})} +_{\mathrm{f}} \underline{(\mathrm{fz})})$]

[PlusAssociativity(R)XX $\stackrel{\text{tex}}{\rightarrow}$ "PlusAssociativity(R)XX"]

[PlusAssociativity(R)XX $\stackrel{\text{pyk}}{\rightarrow}$ "lemma plusAssociativity(R)XX"]

Plus0(R)

[Plus0(R) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[Plus0(R) $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(fx)}\colon R(\underline{(fx)}) + +R(0f) == R(\underline{(fx)})$]

[Plus0(R) $\stackrel{\text{tex}}{\rightarrow}$ "Plus0(R)"]

[Plus0(R) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma plus0(R)"]

Negative(R)

[Negative(R) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[Negative(R) $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{\mathsf{m}}\colon \forall \underline{(fx)}\colon R(\underline{(fx)}) + +(- - R(\underline{(fx)})) == R(0f)$]

[Negative(R) $\stackrel{\text{tex}}{\rightarrow}$ "Negative(R)"]

[Negative(R) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma negative(R)"]

Times1(R)

[Times1(R) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[Times1(R) $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(fx)}\colon R(\underline{(fx)}) * *R(1f) == R(\underline{(fx)})$]

[Times1(R) $\stackrel{\text{tex}}{\rightarrow}$ "Times1(R)"]

[Times1(R) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma times1(R)"]

lessAddition(R)

[lessAddition(R) $\stackrel{\text{tex}}{\rightarrow}$ "lessAddition(R)"]

[lessAddition(R) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma lessAddition(R)"]

PlusCommutativity(R)

[PlusCommutativity(R) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[PlusCommutativity(R) $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(fx)}\colon \forall \underline{(fy)}\colon R(\underline{(fx)}) + +R(\underline{(fy)}) == R(\underline{(fy)}) + +R(\underline{(fx)})$]

[PlusCommutativity(R) $\stackrel{\text{tex}}{\to}$ "PlusCommutativity(R)"]

[PlusCommutativity(R) $\stackrel{\text{pyk}}{\to}$ "lemma plusCommutativity(R)"]

LeqAntisymmetry(R)

[LeqAntisymmetry(R) $\stackrel{\text{tex}}{\to}$ "LeqAntisymmetry(R)"]

[LeqAntisymmetry(R) $\stackrel{\text{pyk}}{\to}$ "lemma leqAntisymmetry(R)"]

LeqTransitivity(R)

[LeqTransitivity(R) $\stackrel{\text{tex}}{\to}$ "LeqTransitivity(R)"]

[LeqTransitivity(R) $\stackrel{\text{pyk}}{\to}$ "lemma leqTransitivity(R)"]

leqAddition(R)

[leqAddition(R) $\stackrel{\text{tex}}{\to}$ "leqAddition(R)"]

[leqAddition(R) $\stackrel{\text{pyk}}{\to}$ "lemma leqAddition(R)"]

Distribution(R)

[Distribution(R) $\stackrel{\text{tex}}{\to}$ "Distribution(R)"]

[Distribution(R) $\stackrel{\text{pyk}}{\to}$ "lemma distribution(R)"]

A4(Axiom)

[A4(Axiom) $\stackrel{\text{proof}}{\to}$ Rule tactic]

[A4(Axiom) $\stackrel{\text{stmt}}{\to}$ SystemQ $\vdash \forall \underline{\mathsf{x}}\colon \forall \underline{(v1)}\colon \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \langle \underline{\mathsf{a}} \equiv \underline{\mathsf{b}} | \underline{(v1)} \colon == \underline{\mathsf{x}} \rangle_{\mathrm{Me}} \Vdash \forall_{\mathrm{obj}} \underline{(v1)}\colon \underline{\mathsf{b}} \Rightarrow \underline{\mathsf{a}}$]

[A4(Axiom) $\stackrel{\text{tex}}{\to}$ "A4(Axiom)"]

[A4(Axiom) $\stackrel{\text{pyk}}{\to}$ "axiom a4"]

InductionAxiom

[InductionAxiom $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[InductionAxiom $\stackrel{\text{stmt}}{\rightarrow}$ $\text{SystemQ} \vdash \forall (\text{v1}) \colon \forall \underline{\mathsf{a}} \colon \forall \underline{\mathsf{b}} \colon \forall \underline{\mathsf{c}} \colon \langle \underline{\mathsf{b}} {\equiv} \underline{\mathsf{a}} | \overline{(\text{v1})} {:=}{=} 0 \rangle_{\text{Me}} \Vdash \langle \underline{\mathsf{c}} {\equiv} \underline{\mathsf{a}} | \underline{(\text{v1})} {:=}{=} (\underline{(\text{v1})} + 1) \rangle_{\text{Me}} \Vdash \underline{\mathsf{b}} \Rightarrow \overline{\forall_{\text{obj}}} \underline{(\text{v1})} \colon \underline{\mathsf{a}} \Rightarrow \underline{\mathsf{c}} \Rightarrow \forall_{\text{obj}} \underline{\overline{(\text{v1})}} \colon \underline{\mathsf{a}}$]

[InductionAxiom $\stackrel{\text{tex}}{\rightarrow}$ “InductionAxiom”]

[InductionAxiom $\stackrel{\text{pyk}}{\rightarrow}$ “axiom induction”]

EqualityAxiom

[EqualityAxiom $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[EqualityAxiom $\stackrel{\text{stmt}}{\rightarrow}$ $\text{SystemQ} \vdash \forall \underline{\mathsf{x}} \colon \forall \underline{\mathsf{y}} \colon \forall \underline{\mathsf{z}} \colon \underline{\mathsf{x}} = \underline{\mathsf{y}} \Rightarrow \underline{\mathsf{x}} = \underline{\mathsf{z}} \Rightarrow \underline{\mathsf{y}} = \underline{\mathsf{z}}$]

[EqualityAxiom $\stackrel{\text{tex}}{\rightarrow}$ “EqualityAxiom”]

[EqualityAxiom $\stackrel{\text{pyk}}{\rightarrow}$ “axiom equality”]

EqLeqAxiom

[EqLeqAxiom $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[EqLeqAxiom $\stackrel{\text{stmt}}{\rightarrow}$ $\text{SystemQ} \vdash \forall \underline{\mathsf{x}} \colon \forall \underline{\mathsf{y}} \colon \underline{\mathsf{x}} = \underline{\mathsf{y}} \Rightarrow \underline{\mathsf{x}} <= \underline{\mathsf{y}}$]

[EqLeqAxiom $\stackrel{\text{tex}}{\rightarrow}$ “EqLeqAxiom”]

[EqLeqAxiom $\stackrel{\text{pyk}}{\rightarrow}$ “axiom eqLeq”]

EqAdditionAxiom

[EqAdditionAxiom $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[EqAdditionAxiom $\stackrel{\text{stmt}}{\rightarrow}$ $\text{SystemQ} \vdash \forall \underline{\mathsf{x}} \colon \forall \underline{\mathsf{y}} \colon \forall \underline{\mathsf{z}} \colon \underline{\mathsf{x}} = \underline{\mathsf{y}} \Rightarrow (\underline{\mathsf{x}} + \underline{\mathsf{z}}) = (\underline{\mathsf{y}} + \underline{\mathsf{z}})$]

[EqAdditionAxiom $\stackrel{\text{tex}}{\rightarrow}$ “EqAdditionAxiom”]

[EqAdditionAxiom $\stackrel{\text{pyk}}{\rightarrow}$ “axiom eqAddition”]

EqMultiplicationAxiom

[EqMultiplicationAxiom $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[EqMultiplicationAxiom $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{\mathsf{x}} \colon \forall \underline{\mathsf{y}} \colon \forall \underline{\mathsf{z}} \colon \underline{\mathsf{x}} = \underline{\mathsf{y}} \Rightarrow (\underline{\mathsf{x}} * \underline{\mathsf{z}}) = (\underline{\mathsf{y}} * \underline{\mathsf{z}})$]

[EqMultiplicationAxiom $\stackrel{\text{tex}}{\rightarrow}$ "EqMultiplicationAxiom"]

[EqMultiplicationAxiom $\stackrel{\text{pyk}}{\rightarrow}$ "axiom eqMultiplication"]

QisClosed(Reciprocal)(Imply)

[QisClosed(Reciprocal)(Imply) $\stackrel{\text{tex}}{\rightarrow}$ "QisClosed(Reciprocal)(Imply)"]

[QisClosed(Reciprocal)(Imply) $\stackrel{\text{pyk}}{\rightarrow}$ "axiom QisClosed(reciprocal)"]

QisClosed(Reciprocal)

[QisClosed(Reciprocal) $\stackrel{\text{tex}}{\rightarrow}$ "QisClosed(Reciprocal)"]

[QisClosed(Reciprocal) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma QisClosed(reciprocal)"]

QisClosed(Negative)(Imply)

[QisClosed(Negative)(Imply) $\stackrel{\text{tex}}{\rightarrow}$ "QisClosed(Negative)(Imply)"]

[QisClosed(Negative)(Imply) $\stackrel{\text{pyk}}{\rightarrow}$ "axiom QisClosed(negative)"]

QisClosed(Negative)

[QisClosed(Negative) $\stackrel{\text{tex}}{\rightarrow}$ "QisClosed(Negative)"]

[QisClosed(Negative) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma QisClosed(negative)"]

leqReflexivity

[leqReflexivity $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[leqReflexivity $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{\mathsf{x}} \colon \underline{\mathsf{x}} <= \underline{\mathsf{x}}$]

[leqReflexivity $\stackrel{\text{tex}}{\rightarrow}$ "leqReflexivity"]

[leqReflexivity $\stackrel{\text{pyk}}{\rightarrow}$ “axiom leqReflexivity”]

leqAntisymmetryAxiom

[leqAntisymmetryAxiom $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[leqAntisymmetryAxiom $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \forall \underline{y}\colon \underline{x} <= \underline{y} \Rightarrow \underline{y} <= \underline{x} \Rightarrow \underline{x} = \underline{y}$]

[leqAntisymmetryAxiom $\stackrel{\text{tex}}{\rightarrow}$ “leqAntisymmetryAxiom”]

[leqAntisymmetryAxiom $\stackrel{\text{pyk}}{\rightarrow}$ “axiom leqAntisymmetry”]

leqTransitivityAxiom

[leqTransitivityAxiom $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[leqTransitivityAxiom $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \forall \underline{y}\colon \forall \underline{z}\colon \underline{x} <= \underline{y} \Rightarrow \underline{y} <= \underline{z} \Rightarrow \underline{x} <= \underline{z}$]

[leqTransitivityAxiom $\stackrel{\text{tex}}{\rightarrow}$ “leqTransitivityAxiom”]

[leqTransitivityAxiom $\stackrel{\text{pyk}}{\rightarrow}$ “axiom leqTransitivity”]

leqTotality

[leqTotality $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[leqTotality $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \forall \underline{y}\colon \dot{\neg}\, (\underline{x} <= \underline{y})\text{n} \Rightarrow \underline{y} <= \underline{x}$]

[leqTotality $\stackrel{\text{tex}}{\rightarrow}$ “leqTotality”]

[leqTotality $\stackrel{\text{pyk}}{\rightarrow}$ “axiom leqTotality”]

leqAdditionAxiom

[leqAdditionAxiom $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[leqAdditionAxiom $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \forall \underline{y}\colon \forall \underline{z}\colon \underline{x} <= \underline{y} \Rightarrow (\underline{x} + \underline{z}) <= (\underline{y} + \underline{z})$]

[leqAdditionAxiom $\stackrel{\text{tex}}{\rightarrow}$ “leqAdditionAxiom”]

[leqAdditionAxiom $\stackrel{\text{pyk}}{\rightarrow}$ “axiom leqAddition”]

leqMultiplicationAxiom

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

[leqMultiplicationAxiom $\overset{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{\mathsf{x}}\colon \forall \underline{\mathsf{y}}\colon \forall \underline{\mathsf{z}}\colon 0 <= \underline{\mathsf{z}} \Rightarrow \underline{\mathsf{x}} <= \underline{\mathsf{y}} \Rightarrow (\underline{\mathsf{x}} * \underline{\mathsf{z}}) <= (\underline{\mathsf{y}} * \underline{\mathsf{z}})$]

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

[leqMultiplicationAxiom $\overset{\text{pyk}}{\rightarrow}$ “axiom leqMultiplication”]

plusAssociativity

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

[plusAssociativity $\overset{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{\mathsf{x}}\colon \forall \underline{\mathsf{y}}\colon \forall \underline{\mathsf{z}}\colon ((\underline{\mathsf{x}} + \underline{\mathsf{y}}) + \underline{\mathsf{z}}) = (\underline{\mathsf{x}} + (\underline{\mathsf{y}} + \underline{\mathsf{z}}))$]

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

[plusAssociativity $\overset{\text{pyk}}{\rightarrow}$ “axiom plusAssociativity”]

plusCommutativity

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

[plusCommutativity $\overset{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{\mathsf{x}}\colon \forall \underline{\mathsf{y}}\colon (\underline{\mathsf{x}} + \underline{\mathsf{y}}) = (\underline{\mathsf{y}} + \underline{\mathsf{x}})$]

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

[plusCommutativity $\overset{\text{pyk}}{\rightarrow}$ “axiom plusCommutativity”]

Negative

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

[Negative $\overset{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{\mathsf{x}}\colon (\underline{\mathsf{x}} + (-\mathrm{u}\underline{\mathsf{x}})) = 0$]

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

[Negative $\overset{\text{pyk}}{\rightarrow}$ “axiom negative”]

plus0

[plus0 $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[plus0 $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon (\underline{x} + 0) = \underline{x}$]

[plus0 $\stackrel{\text{tex}}{\rightarrow}$ "plus0"]

[plus0 $\stackrel{\text{pyk}}{\rightarrow}$ "axiom plus0"]

timesAssociativity

[timesAssociativity $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[timesAssociativity $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \forall \underline{y}\colon \forall \underline{z}\colon ((\underline{x} * \underline{y}) * \underline{z}) = (\underline{x} * (\underline{y} * \underline{z}))$]

[timesAssociativity $\stackrel{\text{tex}}{\rightarrow}$ "timesAssociativity"]

[timesAssociativity $\stackrel{\text{pyk}}{\rightarrow}$ "axiom timesAssociativity"]

timesCommutativity

[timesCommutativity $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[timesCommutativity $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \forall \underline{y}\colon (\underline{x} * \underline{y}) = (\underline{y} * \underline{x})$]

[timesCommutativity $\stackrel{\text{tex}}{\rightarrow}$ "timesCommutativity"]

[timesCommutativity $\stackrel{\text{pyk}}{\rightarrow}$ "axiom timesCommutativity"]

ReciprocalAxiom

[ReciprocalAxiom $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[ReciprocalAxiom $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \dot{\neg}\, (\underline{x} = 0)\mathrm{n} \Rightarrow (\underline{x} * \mathrm{rec}\underline{x}) = 1$]

[ReciprocalAxiom $\stackrel{\text{tex}}{\rightarrow}$ "ReciprocalAxiom"]

[ReciprocalAxiom $\stackrel{\text{pyk}}{\rightarrow}$ "axiom reciprocal"]

times1

[times1 $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic] [times1 $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon (\underline{x} * 1) = \underline{x}$]

[times1 $\stackrel{\text{tex}}{\rightarrow}$ "times1"]

[times1 $\stackrel{\text{pyk}}{\rightarrow}$ "axiom times1"]

Distribution

[Distribution $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[Distribution $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{x}\colon \forall \underline{y}\colon \forall \underline{z}\colon (\underline{x} * (\underline{y} + \underline{z})) = ((\underline{x} * \underline{y}) + (\underline{x} * \underline{z}))$]

[Distribution $\stackrel{\text{tex}}{\rightarrow}$ "Distribution"]

[Distribution $\stackrel{\text{pyk}}{\rightarrow}$ "axiom distribution"]

0not1

[0not1 $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[0not1 $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \dot{\neg}\, (0 = 1)$n]

[0not1 $\stackrel{\text{tex}}{\rightarrow}$ "0not1"]

[0not1 $\stackrel{\text{pyk}}{\rightarrow}$ "axiom 0not1"]

lemma eqLeq(R)

[lemma eqLeq(R) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma eqLeq(R)"]

TimesAssociativity(R)

[TimesAssociativity(R) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[TimesAssociativity(R) $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash$
$\forall \underline{(\text{fx})}\colon \forall \underline{(\text{fy})}\colon \forall \underline{(\text{fz})}\colon \text{R}(\underline{(\text{fx})}) * *\text{R}(\underline{(\text{fy})}) * *\text{R}(\underline{(\text{fz})}) == \text{R}(\underline{(\text{fx})}) * *\text{R}(\underline{(\text{fy})}) * *\text{R}(\underline{(\text{fz})})$]

[TimesAssociativity(R) $\stackrel{\text{tex}}{\rightarrow}$ "TimesAssociativity(R)"]

[TimesAssociativity(R) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma timesAssociativity(R)"]

TimesCommutativity(R)

[TimesCommutativity(R) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[TimesCommutativity(R) $\stackrel{\text{stmt}}{\rightarrow}$ $\mathrm{SystemQ} \vdash \forall \underline{(\mathrm{fx})} \colon \forall \underline{(\mathrm{fy})} \colon \mathrm{R}(\underline{(\mathrm{fx})}) * *\mathrm{R}(\underline{(\mathrm{fy})}) == \mathrm{R}(\underline{(\mathrm{fy})}) * *\mathrm{R}(\underline{(\mathrm{fx})})$]

[TimesCommutativity(R) $\stackrel{\text{tex}}{\rightarrow}$ "TimesCommutativity(R)"]

[TimesCommutativity(R) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma timesCommutativity(R)"]

(Adgic)SameR

[(Adgic)SameR $\stackrel{\text{tex}}{\rightarrow}$ "(Adgic)SameR"]

[(Adgic)SameR $\stackrel{\text{pyk}}{\rightarrow}$ "1rule adhoc sameR"]

Separation2formula(1)

[Separation2formula(1) $\stackrel{\text{tex}}{\rightarrow}$ "Separation2formula(1)"]

[Separation2formula(1) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma separation2formula(1)"]

Separation2formula(2)

[Separation2formula(2) $\stackrel{\text{tex}}{\rightarrow}$ "Separation2formula(2)"]

[Separation2formula(2) $\stackrel{\text{pyk}}{\rightarrow}$ "lemma separation2formula(2)"]

Cauchy

[Cauchy $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[Cauchy $\stackrel{\text{stmt}}{\rightarrow}$ $\mathrm{SystemQ} \vdash \forall \underline{(\mathrm{v1})} \colon \forall \underline{(\mathrm{v2})} \colon \forall \underline{\mathsf{n}} \colon \forall \underline{(\epsilon)} \colon \forall \underline{(\mathrm{fx})} \colon \forall_{\mathrm{obj}} \underline{(\epsilon)} \colon \dot{\neg} (\forall_{\mathrm{obj}} \underline{\mathsf{n}} \colon \dot{\neg} (\forall_{\mathrm{obj}} \underline{(\mathrm{v1})} \colon \forall_{\mathrm{obj}} \underline{(\mathrm{v2})} \colon \dot{\neg} (0 <= \underline{(\epsilon)} \Rightarrow \dot{\neg} (\dot{\neg} (0 = \underline{(\epsilon)})\mathrm{n})\mathrm{n})\mathrm{n} \Rightarrow \underline{\mathsf{n}} <= \underline{(\mathrm{v1})} \Rightarrow \underline{\mathsf{n}} <= \underline{(\mathrm{v2})} \Rightarrow \dot{\neg} (|(\underline{(\mathrm{fx})}[\underline{(\mathrm{v1})}] + (-\mathrm{u}\underline{(\mathrm{fx})}[\underline{(\mathrm{v2})}]))| <= \underline{(\epsilon)} \Rightarrow \dot{\neg} (\dot{\neg} (|(\underline{(\mathrm{fx})}[\underline{(\mathrm{v1})}] + (-\mathrm{u}\underline{(\mathrm{fx})}[\underline{(\mathrm{v2})}]))| = \underline{(\epsilon)})\mathrm{n})\mathrm{n})\mathrm{n})\mathrm{n})\mathrm{n}$]

[Cauchy $\stackrel{\text{tex}}{\rightarrow}$ "Cauchy"]

[Cauchy $\stackrel{\text{pyk}}{\rightarrow}$ "axiom cauchy"]

PlusF

[PlusF $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[PlusF $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{\mathsf{m}}\colon \forall \underline{(\mathrm{fx})}\colon \forall \underline{(\mathrm{fy})}\colon \underline{(\mathrm{fx})} +_{\mathrm{f}} \underline{(\mathrm{fy})}[\underline{\mathsf{m}}] = (\underline{(\mathrm{fx})}[\underline{\mathsf{m}}] + \underline{(\mathrm{fy})}[\underline{\mathsf{m}}])$]

[PlusF $\stackrel{\text{tex}}{\rightarrow}$ “PlusF”]

[PlusF $\stackrel{\text{pyk}}{\rightarrow}$ “axiom plusF”]

ReciprocalF

[ReciprocalF $\stackrel{\text{tex}}{\rightarrow}$ “ReciprocalF”]

[ReciprocalF $\stackrel{\text{pyk}}{\rightarrow}$ “axiom reciprocalF”]

From ==

[From $==\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[From $==\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(\mathrm{fx})}\colon \forall \underline{(\mathrm{fy})}\colon \mathrm{R}(\underline{(\mathrm{fx})}) == \mathrm{R}(\underline{(\mathrm{fy})}) \vdash \mathrm{SF}(\underline{(\mathrm{fx})}, \underline{(\mathrm{fy})})$]

[From $==\stackrel{\text{tex}}{\rightarrow}$ “From==”]

[From $==\stackrel{\text{pyk}}{\rightarrow}$ “1rule from==”]

To ==

[To $==\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[To $==\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(\mathrm{fx})}\colon \forall \underline{(\mathrm{fy})}\colon \mathrm{SF}(\underline{(\mathrm{fx})}, \underline{(\mathrm{fy})}) \vdash \mathrm{R}(\underline{(\mathrm{fx})}) == \mathrm{R}(\underline{(\mathrm{fy})})$]

[To $==\stackrel{\text{tex}}{\rightarrow}$ “To==”]

[To $==\stackrel{\text{pyk}}{\rightarrow}$ “1rule to==”]

FromInR

[FromInR $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[FromInR $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(\mathrm{fx})}\colon \forall \underline{(\mathrm{fy})}\colon \underline{(\mathrm{fx})} \in \mathrm{R}(\underline{(\mathrm{fy})}) \vdash \mathrm{SF}(\underline{(\mathrm{fx})}, \underline{(\mathrm{fy})})$]

[FromInR $\stackrel{\text{tex}}{\rightarrow}$ “FromInR”]

[FromInR $\overset{\text{pyk}}{\rightarrow}$ "1rule fromInR"]

PlusR(Sym)

[PlusR(Sym) $\overset{\text{tex}}{\rightarrow}$ "PlusR(Sym)"]

[PlusR(Sym) $\overset{\text{pyk}}{\rightarrow}$ "lemma plusR(Sym)"]

ReciprocalR(Axiom)

[ReciprocalR(Axiom) $\overset{\text{tex}}{\rightarrow}$ "ReciprocalR(Axiom)"]

[ReciprocalR(Axiom) $\overset{\text{pyk}}{\rightarrow}$ "axiom reciprocalR"]

LessMinus1(N)

[LessMinus1(N) $\overset{\text{proof}}{\rightarrow}$ Rule tactic]

[LessMinus1(N) $\overset{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{m}\colon \forall \underline{n}\colon \mathrm{Nat}(\underline{m}) \Vdash \mathrm{Nat}(\underline{n}) \Vdash \dot{\neg}\,(\underline{m} <= (\underline{n}+1) \Rightarrow \dot{\neg}\,(\dot{\neg}\,(\underline{m} = (\underline{n}+1))\mathrm{n})\mathrm{n})\mathrm{n} \vdash \underline{m} <= \underline{n}$]

[LessMinus1(N) $\overset{\text{tex}}{\rightarrow}$ "LessMinus1(N)"]

[LessMinus1(N) $\overset{\text{pyk}}{\rightarrow}$ "1rule lessMinus1(N)"]

Nonnegative(N)

[Nonnegative(N) $\overset{\text{proof}}{\rightarrow}$ Rule tactic]

[Nonnegative(N) $\overset{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{m}\colon \mathrm{Nat}(\underline{m}) \Vdash 0 <= \underline{m}$]

[Nonnegative(N) $\overset{\text{tex}}{\rightarrow}$ "Nonnegative(N)"]

[Nonnegative(N) $\overset{\text{pyk}}{\rightarrow}$ "axiom nonnegative(N)"]

US0

[US0 $\overset{\text{proof}}{\rightarrow}$ Rule tactic]

[US0 $\overset{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \mathrm{us}[0] == \mathrm{xs}[0] + +\mathrm{R}(1\mathrm{f})$]

[US0 $\overset{\text{tex}}{\rightarrow}$ "US0"]

[US0 $\stackrel{\text{pyk}}{\to}$ "axiom US0"]

NextXS(UpperBound)

[NextXS(UpperBound) $\stackrel{\text{proof}}{\to}$ Rule tactic]

[NextXS(UpperBound) $\stackrel{\text{stmt}}{\to}$ SystemQ $\vdash$
$\forall \underline{m}\colon \text{UB}(01//02 * *\text{xs}[\underline{m}] + +\text{us}[\underline{m}], \text{SetOfReals}) \vdash \text{xs}[(\underline{m}+1)] == \text{xs}[\underline{m}]$]

[NextXS(UpperBound) $\stackrel{\text{tex}}{\to}$ "NextXS(UpperBound)"]

[NextXS(UpperBound) $\stackrel{\text{pyk}}{\to}$ "1rule nextXS(upperBound)"]

NextXS(NoUpperBound)

[NextXS(NoUpperBound) $\stackrel{\text{proof}}{\to}$ Rule tactic]

[NextXS(NoUpperBound) $\stackrel{\text{stmt}}{\to}$ SystemQ $\vdash \forall \underline{m}\colon \dot{\neg}\,(\text{UB}(01//02 * *\text{xs}[\underline{m}] +$
$+\text{us}[\underline{m}], \text{SetOfReals}))\text{n} \vdash \text{xs}[(\underline{m}+1)] == 01//02 * *\text{xs}[\underline{m}] + +\text{us}[\underline{m}]$]

[NextXS(NoUpperBound) $\stackrel{\text{tex}}{\to}$ "NextXS(NoUpperBound)"]

[NextXS(NoUpperBound) $\stackrel{\text{pyk}}{\to}$ "1rule nextXS(noUpperBound)"]

NextUS(UpperBound)

[NextUS(UpperBound) $\stackrel{\text{proof}}{\to}$ Rule tactic]

[NextUS(UpperBound) $\stackrel{\text{stmt}}{\to}$ SystemQ $\vdash \forall \underline{m}\colon \text{UB}(01//02 * *\text{xs}[\underline{m}] +$
$+\text{us}[\underline{m}], \text{SetOfReals}) \vdash \text{us}[(\underline{m}+1)] == 01//02 * *\text{xs}[\underline{m}] + +\text{us}[\underline{m}]$]

[NextUS(UpperBound) $\stackrel{\text{tex}}{\to}$ "NextUS(UpperBound)"]

[NextUS(UpperBound) $\stackrel{\text{pyk}}{\to}$ "1rule nextUS(upperBound)"]

NextUS(NoUpperBound)

[NextUS(NoUpperBound) $\stackrel{\text{proof}}{\to}$ Rule tactic]

[NextUS(NoUpperBound) $\stackrel{\text{stmt}}{\to}$ SystemQ $\vdash$
$\forall \underline{m}\colon \dot{\neg}\,(\text{UB}(01//02 * *\text{xs}[\underline{m}] + +\text{us}[\underline{m}], \text{SetOfReals}))\text{n} \vdash \text{us}[(\underline{m}+1)] == \text{us}[\underline{m}]$]

[NextUS(NoUpperBound) $\stackrel{\text{tex}}{\to}$ "NextUS(NoUpperBound)"]

[NextUS(NoUpperBound) $\stackrel{\text{pyk}}{\to}$ "1rule nextUS(noUpperBound)"]

ExpZero

[ExpZero $\stackrel{\text{proof}}{\to}$ Rule tactic]

[ExpZero $\stackrel{\text{stmt}}{\to}$ SystemQ $\vdash \forall \underline{m}\colon \forall \underline{x}\colon \underline{m} = 0 \vdash \underline{x}(\exp)\underline{m} = 1$]

[ExpZero $\stackrel{\text{tex}}{\to}$ "ExpZero"]

[ExpZero $\stackrel{\text{pyk}}{\to}$ "1rule expZero"]

ExpPositive

[ExpPositive $\stackrel{\text{proof}}{\to}$ Rule tactic]

[ExpPositive $\stackrel{\text{stmt}}{\to}$ SystemQ $\vdash \forall \underline{m}\colon \forall \underline{x}\colon \dot{\neg}\,(0 <= \underline{m} \Rightarrow \dot{\neg}\,(\dot{\neg}\,(0 = \underline{m})n)n)n \vdash$
$\underline{x}(\exp)\underline{m} = (\underline{x} * \underline{x}(\exp)(\underline{m} + (-u1)))$]

[ExpPositive $\stackrel{\text{tex}}{\to}$ "ExpPositive"]

[ExpPositive $\stackrel{\text{pyk}}{\to}$ "1rule expPositive"]

ExpZero(R)

[ExpZero(R) $\stackrel{\text{tex}}{\to}$ "ExpZero(R)"]

[ExpZero(R) $\stackrel{\text{pyk}}{\to}$ "1rule expZero(R)"]

ExpPositive(R)

[ExpPositive(R) $\stackrel{\text{tex}}{\to}$ "ExpPositive(R)"]

[ExpPositive(R) $\stackrel{\text{pyk}}{\to}$ "1rule expPositive(R)"]

BSzero

[BSzero $\stackrel{\text{proof}}{\to}$ Rule tactic]

[BSzero $\stackrel{\text{stmt}}{\to}$ SystemQ $\vdash \forall \underline{m}\colon \forall \underline{n}\colon \underline{n} = 0 \vdash BS(\underline{m}, \underline{n}) = rec(1 + 1)(\exp)\underline{m}$]

[BSzero $\stackrel{\text{tex}}{\to}$ "BSzero"]

[BSzero $\stackrel{\text{pyk}}{\rightarrow}$ "1rule base(1/2)Sum zero"]

BSpositive

[BSpositive $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[BSpositive $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{m}\colon \forall \underline{n}\colon \dot{\neg}\,(0 <= \underline{n} \Rightarrow \dot{\neg}\,(\dot{\neg}\,(0 = \underline{n})\text{n})\text{n})\text{n} \vdash$ $\text{BS}(\underline{m}, \underline{n}) = (\text{rec}(1+1)(\text{exp})(\underline{m}+\underline{n}) + \text{BS}(\underline{m}, (\underline{n} + (-\text{u}1))))$]

[BSpositive $\stackrel{\text{tex}}{\rightarrow}$ "BSpositive"]

[BSpositive $\stackrel{\text{pyk}}{\rightarrow}$ "1rule base(1/2)Sum positive"]

UStelescope(Zero)

[UStelescope(Zero) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[UStelescope(Zero) $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{m}\colon \forall \underline{n}\colon \underline{n} = 0 \vdash \text{UStelescope}(\underline{m}, \underline{n}) =$ $|(\text{us}[\underline{m}] + (-\text{uus}[(\underline{m}+1)]))|$]

[UStelescope(Zero) $\stackrel{\text{tex}}{\rightarrow}$ "UStelescope(Zero)"]

[UStelescope(Zero) $\stackrel{\text{pyk}}{\rightarrow}$ "1rule UStelescope zero"]

UStelescope(Positive)

[UStelescope(Positive) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[UStelescope(Positive) $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{m}\colon \forall \underline{n}\colon \dot{\neg}\,(0 <= \underline{n} \Rightarrow \dot{\neg}\,(\dot{\neg}\,(0 =$ $\underline{n})\text{n})\text{n})\text{n} \vdash \text{UStelescope}(\underline{m}, \underline{n}) =$ $(|(\text{us}[(\underline{m}+\underline{n})] + (-\text{uus}[(\underline{m} + (\underline{n}+1))]))| + \text{UStelescope}(\underline{m}, (\underline{n} + (-\text{u}1))))$]

[UStelescope(Positive) $\stackrel{\text{tex}}{\rightarrow}$ "UStelescope(Positive)"]

[UStelescope(Positive) $\stackrel{\text{pyk}}{\rightarrow}$ "1rule UStelescope positive"]

EqAddition(R)

[EqAddition(R) $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[EqAddition(R) $\stackrel{\text{stmt}}{\rightarrow}$ SystemQ $\vdash \forall \underline{(\text{fx})}\colon \forall \underline{(\text{fy})}\colon \forall \underline{(\text{fz})}\colon \text{R}(\underline{(\text{fx})}) = \text{R}(\underline{(\text{fy})}) \vdash$ $\text{R}(\underline{(\text{fx})}) + +\text{R}(\underline{(\text{fz})}) = \text{R}(\underline{(\text{fy})}) + +\overline{\text{R}(\underline{(\text{fz})})}$]

[EqAddition(R) $\stackrel{\text{tex}}{\to}$ "EqAddition(R)"]

[EqAddition(R) $\stackrel{\text{pyk}}{\to}$ "1rule adhoc eqAddition(R)"]

FromLimit

[FromLimit $\stackrel{\text{tex}}{\to}$ "FromLimit"]

[FromLimit $\stackrel{\text{pyk}}{\to}$ "1rule fromLimit"]

ToUpperBound

[ToUpperBound $\stackrel{\text{tex}}{\to}$ "ToUpperBound"]

[ToUpperBound $\stackrel{\text{pyk}}{\to}$ "1rule toUpperBound"]

FromUpperBound

[FromUpperBound $\stackrel{\text{tex}}{\to}$ "FromUpperBound"]

[FromUpperBound $\stackrel{\text{pyk}}{\to}$ "1rule fromUpperBound"]

USisUpperBound

[USisUpperBound $\stackrel{\text{tex}}{\to}$ "USisUpperBound"]

[USisUpperBound $\stackrel{\text{pyk}}{\to}$ "axiom USisUpperBound"]

0not1(R)

[0not1(R) $\stackrel{\text{tex}}{\to}$ "0not1(R)"]

[0not1(R) $\stackrel{\text{pyk}}{\to}$ "axiom 0not1(R)"]

ExpUnbounded(R)

[ExpUnbounded(R) $\stackrel{\text{tex}}{\to}$ "ExpUnbounded(R)"]

[ExpUnbounded(R) $\stackrel{\text{pyk}}{\to}$ "1rule expUnbounded"]

FromLeq(Advanced)(N)

[FromLeq(Advanced)(N) $\stackrel{\text{tex}}{\rightarrow}$ “FromLeq(Advanced)(N)”]

[FromLeq(Advanced)(N) $\stackrel{\text{pyk}}{\rightarrow}$ “1rule fromLeq(Advanced)(N)”]

FromLeastUpperBound

[FromLeastUpperBound $\stackrel{\text{tex}}{\rightarrow}$ “FromLeastUpperBound”]

[FromLeastUpperBound $\stackrel{\text{pyk}}{\rightarrow}$ “1rule fromLeastUpperBound”]

ToLeastUpperBound

[ToLeastUpperBound $\stackrel{\text{tex}}{\rightarrow}$ “ToLeastUpperBound”]

[ToLeastUpperBound $\stackrel{\text{pyk}}{\rightarrow}$ “1rule toLeastUpperBound”]

XSisNotUpperBound

[XSisNotUpperBound $\stackrel{\text{tex}}{\rightarrow}$ “XSisNotUpperBound”]

[XSisNotUpperBound $\stackrel{\text{pyk}}{\rightarrow}$ “axiom XSisNotUpperBound”]

ysFGreater

[ysFGreater $\stackrel{\text{tex}}{\rightarrow}$ “ysFGreater”]

[ysFGreater $\stackrel{\text{pyk}}{\rightarrow}$ “axiom ysFGreater”]

ysFLess

[ysFLess $\stackrel{\text{tex}}{\rightarrow}$ “ysFLess”]

[ysFLess $\stackrel{\text{pyk}}{\rightarrow}$ “axiom ysFLess”]

SmallInverse

[SmallInverse $\stackrel{\text{tex}}{\rightarrow}$ “SmallInverse”]

[SmallInverse $\stackrel{\text{pyk}}{\to}$ “1rule smallInverse”]

NatType

[NatType $\stackrel{\text{tex}}{\to}$ “NatType”]

[NatType $\stackrel{\text{pyk}}{\to}$ “axiom natType”]

RationalType

[RationalType $\stackrel{\text{tex}}{\to}$ “RationalType”]

[RationalType $\stackrel{\text{pyk}}{\to}$ “axiom rationalType”]

SeriesType

[SeriesType $\stackrel{\text{tex}}{\to}$ “SeriesType”]

[SeriesType $\stackrel{\text{pyk}}{\to}$ “axiom seriesType”]

Max

[Max $\stackrel{\text{tex}}{\to}$ “Max”]

[Max $\stackrel{\text{pyk}}{\to}$ “axiom max”]

Numerical

[Numerical $\stackrel{\text{tex}}{\to}$ “Numerical”]

[Numerical $\stackrel{\text{pyk}}{\to}$ “axiom numerical”]

NumericalF

[NumericalF $\stackrel{\text{tex}}{\to}$ “NumericalF”]

[NumericalF $\stackrel{\text{pyk}}{\to}$ “axiom numericalF”]

MemberOfSeries(Imply)

[MemberOfSeries(Imply) $\stackrel{\text{tex}}{\to}$ "MemberOfSeries(Imply)"]

[MemberOfSeries(Imply) $\stackrel{\text{pyk}}{\to}$ "axiom memberOfSeries"]

JoinConjuncts(2conditions)

[JoinConjuncts(2conditions) $\stackrel{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c} \vdash \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{d} \vdash \underline{a} \vdash \underline{b} \vdash \text{MP2} \rhd \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c} \rhd \underline{a} \rhd \underline{b} \gg \underline{c}; \text{MP2} \rhd \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{d} \rhd \underline{a} \rhd \underline{b} \gg \underline{d}; \text{JoinConjuncts} \rhd \underline{c} \rhd \underline{d} \gg \dot{\neg}(\underline{c} \Rightarrow \dot{\neg}(\underline{d})\text{n})\text{n}; \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \text{Ded} \rhd \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c} \vdash \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{d} \vdash \underline{a} \vdash \underline{b} \vdash \dot{\neg}(\underline{c} \Rightarrow \dot{\neg}(\underline{d})\text{n})\text{n} \gg \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{a} \Rightarrow \underline{b} \Rightarrow \dot{\neg}(\underline{c} \Rightarrow \dot{\neg}(\underline{d})\text{n})\text{n}; \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c} \vdash \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{d} \vdash \text{MP2} \rhd \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{a} \Rightarrow \underline{b} \Rightarrow \dot{\neg}(\underline{c} \Rightarrow \dot{\neg}(\underline{d})\text{n})\text{n} \rhd \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c} \rhd \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{d} \gg \underline{a} \Rightarrow \underline{b} \Rightarrow \dot{\neg}(\underline{c} \Rightarrow \dot{\neg}(\underline{d})\text{n})\text{n}\rceil, \text{p}_0, c)$]

[JoinConjuncts(2conditions) $\stackrel{\text{stmt}}{\to}$ $\text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c} \vdash \underline{a} \Rightarrow \underline{b} \Rightarrow \underline{d} \vdash \underline{a} \Rightarrow \underline{b} \Rightarrow \dot{\neg}(\underline{c} \Rightarrow \dot{\neg}(\underline{d})\text{n})\text{n}$]

[JoinConjuncts(2conditions) $\stackrel{\text{tex}}{\to}$ "JoinConjuncts(2conditions)"]

[JoinConjuncts(2conditions) $\stackrel{\text{pyk}}{\to}$ "prop lemma doubly conditioned join conjuncts"]

prop lemma imply negation

[prop lemma imply negation $\stackrel{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}\colon \underline{a} \Rightarrow \dot{\neg}(\underline{a})\text{n} \vdash \text{AutoImply} \gg \dot{\neg}(\underline{a})\text{n} \Rightarrow \dot{\neg}(\underline{a})\text{n}; \text{TND} \gg \dot{\neg}(\underline{a})\text{n} \Rightarrow \dot{\neg}(\underline{a})\text{n}; \text{FromDisjuncts} \rhd \dot{\neg}(\underline{a})\text{n} \Rightarrow \dot{\neg}(\underline{a})\text{n} \rhd \underline{a} \Rightarrow \dot{\neg}(\underline{a})\text{n} \rhd \dot{\neg}(\underline{a})\text{n} \Rightarrow \dot{\neg}(\underline{a})\text{n} \gg \dot{\neg}(\underline{a})\text{n}\rceil, \text{p}_0, c)$]

[prop lemma imply negation $\stackrel{\text{stmt}}{\to}$ $\text{SystemQ} \vdash \forall \underline{a}\colon \underline{a} \Rightarrow \dot{\neg}(\underline{a})\text{n} \vdash \dot{\neg}(\underline{a})\text{n}$]

[prop lemma imply negation $\stackrel{\text{pyk}}{\to}$ "prop lemma imply negation"]

TND

[TND $\stackrel{\text{proof}}{\to}$ $\lambda c.\lambda x.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}\colon \text{AutoImply} \gg \dot{\neg}(\underline{a})\text{n} \Rightarrow \dot{\neg}(\underline{a})\text{n}; \text{Repetition} \rhd \dot{\neg}(\underline{a})\text{n} \Rightarrow \dot{\neg}(\underline{a})\text{n} \gg \dot{\neg}(\underline{a})\text{n} \Rightarrow \dot{\neg}(\underline{a})\text{n}\rceil, \text{p}_0, c)$]

[TND $\stackrel{\text{stmt}}{\to}$ $\text{SystemQ} \vdash \forall \underline{a}\colon \dot{\neg}(\underline{a})\text{n} \Rightarrow \dot{\neg}(\underline{a})\text{n}$]

[TND $\stackrel{\text{tex}}{\to}$ "TND"]

[TND $\stackrel{\text{pyk}}{\to}$ "prop lemma tertium non datur"]

FromNegatedImply

$[\text{FromNegatedImply} \stackrel{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \vdash \underline{a} \vdash \text{MP} \rhd \underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \rhd \underline{a} \gg \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n}; \text{RemoveDoubleNeg} \rhd \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \gg \underline{b}; \forall \underline{a}\colon \forall \underline{b}\colon \text{Ded} \rhd \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \vdash \underline{a} \vdash \underline{b} \gg \underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \Rightarrow \underline{a} \Rightarrow \underline{b}; \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n} \vdash \text{MT} \rhd \underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \Rightarrow \underline{a} \Rightarrow \underline{b} \rhd \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n} \gg \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n})\mathrm{n}; \text{Repetition} \rhd \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n})\mathrm{n} \gg \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n})\mathrm{n}\rceil, \mathrm{p}_0, c)]$

$[\text{FromNegatedImply} \stackrel{\text{stmt}}{\rightarrow} \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n} \vdash \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b})\mathrm{n})\mathrm{n})\mathrm{n}]$

$[\text{FromNegatedImply} \stackrel{\text{tex}}{\rightarrow} \text{“FromNegatedImply”}]$

$[\text{FromNegatedImply} \stackrel{\text{pyk}}{\rightarrow} \text{“prop lemma from negated imply”}]$

ToNegatedImply

$[\text{ToNegatedImply} \stackrel{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \vdash \dot{\neg}(\underline{b})\mathrm{n} \vdash \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \vdash \text{RemoveDoubleNeg} \rhd \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \gg \underline{a} \Rightarrow \underline{b}; \text{MP} \rhd \underline{a} \Rightarrow \underline{b} \rhd \underline{a} \gg \underline{b}; \text{FromContradiction} \rhd \underline{b} \rhd \dot{\neg}(\underline{b})\mathrm{n} \gg \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n}; \forall \underline{a}\colon \forall \underline{b}\colon \text{Ded} \rhd \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \vdash \dot{\neg}(\underline{b})\mathrm{n} \vdash \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \vdash \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n} \gg \underline{a} \Rightarrow \dot{\neg}(\underline{b})\mathrm{n} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n}; \underline{a} \vdash \dot{\neg}(\underline{b})\mathrm{n} \vdash \text{MP2} \rhd \underline{a} \Rightarrow \dot{\neg}(\underline{b})\mathrm{n} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n} \rhd \underline{a} \rhd \dot{\neg}(\underline{b})\mathrm{n} \gg \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n}; \text{AutoImply} \gg \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n}; \text{Neg} \rhd \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n} \rhd \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n})\mathrm{n} \gg \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n}\rceil, \mathrm{p}_0, c)]$

$[\text{ToNegatedImply} \stackrel{\text{stmt}}{\rightarrow} \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \vdash \dot{\neg}(\underline{b})\mathrm{n} \vdash \dot{\neg}(\underline{a} \Rightarrow \underline{b})\mathrm{n}]$

$[\text{ToNegatedImply} \stackrel{\text{tex}}{\rightarrow} \text{“ToNegatedImply”}]$

$[\text{ToNegatedImply} \stackrel{\text{pyk}}{\rightarrow} \text{“prop lemma to negated imply”}]$

FromNegated(2 ∗ Imply)

$[\text{FromNegated}(2 * \text{Imply}) \stackrel{\text{proof}}{\rightarrow} \lambda c.\lambda x.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \dot{\neg}(\underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c})\mathrm{n} \vdash \text{FromNegatedImply} \rhd \dot{\neg}(\underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c})\mathrm{n} \gg \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b} \Rightarrow \underline{c})\mathrm{n})\mathrm{n})\mathrm{n}; \text{FirstConjunct} \rhd \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b} \Rightarrow \underline{c})\mathrm{n})\mathrm{n})\mathrm{n} \gg \underline{a}; \text{SecondConjunct} \rhd \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{b} \Rightarrow \underline{c})\mathrm{n})\mathrm{n})\mathrm{n} \gg \dot{\neg}(\underline{b} \Rightarrow \underline{c})\mathrm{n}; \text{FromNegatedImply} \rhd \dot{\neg}(\underline{b} \Rightarrow \underline{c})\mathrm{n} \gg \dot{\neg}(\underline{b} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{c})\mathrm{n})\mathrm{n})\mathrm{n}; \text{FirstConjunct} \rhd \dot{\neg}(\underline{b} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{c})\mathrm{n})\mathrm{n})\mathrm{n} \gg \underline{b}; \text{SecondConjunct} \rhd \dot{\neg}(\underline{b} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{c})\mathrm{n})\mathrm{n})\mathrm{n} \gg \dot{\neg}(\underline{c})\mathrm{n}; \text{JoinConjuncts} \rhd \underline{a} \rhd \underline{b} \gg \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{b})\mathrm{n})\mathrm{n}; \text{JoinConjuncts} \rhd \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \rhd \dot{\neg}(\underline{c})\mathrm{n} \gg \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{c})\mathrm{n})\mathrm{n})\mathrm{n}\rceil, \mathrm{p}_0, c)]$

$[\text{FromNegated}(2 * \text{Imply}) \stackrel{\text{stmt}}{\rightarrow} \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \dot{\neg}(\underline{a} \Rightarrow \underline{b} \Rightarrow \underline{c})\mathrm{n} \vdash \dot{\neg}(\dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{b})\mathrm{n})\mathrm{n} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{c})\mathrm{n})\mathrm{n})\mathrm{n}]$

[FromNegated(2 $*$ Imply) $\stackrel{\text{tex}}{\rightarrow}$ "FromNegated(2∗Imply)"]

[FromNegated(2 $*$ Imply) $\stackrel{\text{pyk}}{\rightarrow}$ "prop lemma from negated double imply"]

FromNegatedAnd

[FromNegatedAnd $\stackrel{\text{proof}}{\rightarrow}$ $\lambda \mathsf{c}.\lambda \mathsf{x}.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}} \Rightarrow \dot{\neg}(\underline{\mathsf{b}})n)n)n \vdash \underline{\mathsf{a}} \vdash \text{Repetition} \rhd \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}} \Rightarrow \dot{\neg}(\underline{\mathsf{b}})n)n)n \gg \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}} \Rightarrow \dot{\neg}(\underline{\mathsf{b}})n)n)n; \text{RemoveDoubleNeg} \rhd \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}} \Rightarrow \dot{\neg}(\underline{\mathsf{b}})n)n)n \gg \underline{\mathsf{a}} \Rightarrow \dot{\neg}(\underline{\mathsf{b}})n; \text{MP} \rhd \underline{\mathsf{a}} \Rightarrow \dot{\neg}(\underline{\mathsf{b}})n \rhd \underline{\mathsf{a}} \gg \dot{\neg}(\underline{\mathsf{b}})n\rceil, p_0, \mathsf{c})$]

[FromNegatedAnd $\stackrel{\text{stmt}}{\rightarrow}$ $\text{SystemQ} \vdash \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}} \Rightarrow \dot{\neg}(\underline{\mathsf{b}})n)n)n \vdash \underline{\mathsf{a}} \vdash \dot{\neg}(\underline{\mathsf{b}})n$]

[FromNegatedAnd $\stackrel{\text{tex}}{\rightarrow}$ "FromNegatedAnd"]

[FromNegatedAnd $\stackrel{\text{pyk}}{\rightarrow}$ "prop lemma from negated and"]

FromNegatedOr

[FromNegatedOr $\stackrel{\text{proof}}{\rightarrow}$ $\lambda \mathsf{c}.\lambda \mathsf{x}.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n \vdash \text{Repetition} \rhd \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n \gg \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n; \text{FromNegatedImply} \rhd \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n \gg \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n\rceil, p_0, \mathsf{c})$]

[FromNegatedOr $\stackrel{\text{stmt}}{\rightarrow}$ $\text{SystemQ} \vdash \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n \vdash \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n$]

[FromNegatedOr $\stackrel{\text{tex}}{\rightarrow}$ "FromNegatedOr"]

[FromNegatedOr $\stackrel{\text{pyk}}{\rightarrow}$ "prop lemma from negated or"]

ToNegatedOr

[ToNegatedOr $\stackrel{\text{proof}}{\rightarrow}$ $\lambda \mathsf{c}.\lambda \mathsf{x}.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n \vdash \dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}} \vdash \text{FirstConjunct} \rhd \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n \gg \dot{\neg}(\underline{\mathsf{a}})n; \text{SecondConjunct} \rhd \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n \gg \dot{\neg}(\underline{\mathsf{b}})n; \text{NegateDisjunct1} \rhd \dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}} \rhd \dot{\neg}(\underline{\mathsf{a}})n \gg \underline{\mathsf{b}}; \text{FromContradiction} \rhd \underline{\mathsf{b}} \rhd \dot{\neg}(\underline{\mathsf{b}})n \gg \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n; \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \text{Ded} \rhd \forall \underline{\mathsf{a}}\colon \forall \underline{\mathsf{b}}\colon \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n \vdash \dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}} \vdash \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n \gg \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n \Rightarrow \dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n; \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n \vdash \text{MP} \rhd \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n \Rightarrow \dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n \rhd \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{b}})n)n)n \gg \dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n; \text{prop lemma imply negation} \rhd \dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}} \Rightarrow \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n \gg \dot{\neg}(\dot{\neg}(\underline{\mathsf{a}})n \Rightarrow \underline{\mathsf{b}})n\rceil, p_0, \mathsf{c})$]

[ToNegatedOr $\overset{\text{stmt}}{\to}$ SystemQ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon \dot{\neg}\,(\dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\dot{\neg}\,(\underline{b})\text{n})\text{n})\text{n} \vdash \dot{\neg}\,(\dot{\neg}\,(\underline{a})\text{n} \Rightarrow \underline{b})\text{n}$]

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

[ToNegatedOr $\overset{\text{pyk}}{\to}$ “prop lemma to negated or”]

FromNegations

[FromNegations $\overset{\text{proof}}{\to}$ $\lambda \mathsf{c}.\lambda \mathsf{x}.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \Rightarrow \underline{b} \vdash \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \underline{b} \vdash \text{TND} \gg \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{a})\text{n}; \text{FromDisjuncts} \rhd \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{a})\text{n} \rhd \underline{a} \Rightarrow \underline{b} \rhd \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \underline{b} \gg \underline{b}\rceil, \text{p}_0, \mathsf{c})$]

[FromNegations $\overset{\text{stmt}}{\to}$ SystemQ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon \underline{a} \Rightarrow \underline{b} \vdash \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \underline{b} \vdash \underline{b}$]

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

[FromNegations $\overset{\text{pyk}}{\to}$ “prop lemma from negations”]

From3Disjuncts

[From3Disjuncts $\overset{\text{proof}}{\to}$ $\lambda \mathsf{c}.\lambda \mathsf{x}.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \vdash \underline{b} \Rightarrow \underline{d} \vdash \underline{c} \Rightarrow \underline{d} \vdash \dot{\neg}\,(\underline{a})\text{n} \vdash \text{Repetition} \rhd \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \gg \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c}; \text{MP} \rhd \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \rhd \dot{\neg}\,(\underline{a})\text{n} \gg \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c}; \text{FromDisjuncts} \rhd \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \rhd \underline{b} \Rightarrow \underline{d} \rhd \underline{c} \Rightarrow \underline{d} \gg \underline{d}; \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \text{Ded} \rhd \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \vdash \underline{b} \Rightarrow \underline{d} \vdash \underline{c} \Rightarrow \underline{d} \vdash \dot{\neg}\,(\underline{a})\text{n} \vdash \underline{d} \gg \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \Rightarrow \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{c} \Rightarrow \underline{d} \Rightarrow \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \underline{d}; \text{AutoImply} \gg \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{a} \Rightarrow \underline{d}; \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \vdash \underline{a} \Rightarrow \underline{d} \vdash \underline{b} \Rightarrow \underline{d} \vdash \underline{c} \Rightarrow \underline{d} \vdash \text{MP3} \rhd \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \Rightarrow \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{c} \Rightarrow \underline{d} \Rightarrow \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \underline{d} \rhd \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \rhd \underline{b} \Rightarrow \underline{d} \rhd \underline{c} \Rightarrow \underline{d} \gg \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \underline{d}; \text{MP} \rhd \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{a} \Rightarrow \underline{d} \rhd \underline{a} \Rightarrow \underline{d} \gg \underline{a} \Rightarrow \underline{d}; \text{FromNegations} \rhd \underline{a} \Rightarrow \underline{d} \rhd \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \underline{d} \gg \underline{d}\rceil, \text{p}_0, \mathsf{c})$]

[From3Disjuncts $\overset{\text{stmt}}{\to}$ SystemQ $\vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \dot{\neg}\,(\underline{b})\text{n} \Rightarrow \underline{c} \vdash \underline{a} \Rightarrow \underline{d} \vdash \underline{b} \Rightarrow \underline{d} \vdash \underline{c} \Rightarrow \underline{d} \vdash \underline{d}$]

[From3Disjuncts $\overset{\text{tex}}{\to}$ “From3Disjuncts”]

[From3Disjuncts $\overset{\text{pyk}}{\to}$ “prop lemma from three disjuncts”]

From2 $*$ 2Disjuncts

[From2 $*$ 2Disjuncts $\overset{\text{proof}}{\to}$ $\lambda \mathsf{c}.\lambda \mathsf{x}.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \forall \underline{e}\colon \dot{\neg}\,(\underline{c})\text{n} \Rightarrow \underline{d} \vdash \underline{a} \Rightarrow \underline{c} \Rightarrow \underline{e} \vdash \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{e} \vdash \underline{a} \vdash \text{MP} \rhd \underline{a} \Rightarrow \underline{c} \Rightarrow \underline{e} \rhd \underline{a} \gg \underline{c} \Rightarrow \underline{e}; \text{MP} \rhd \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{e} \rhd \underline{a} \gg \underline{d} \Rightarrow \underline{e}; \text{FromDisjuncts} \rhd \dot{\neg}\,(\underline{c})\text{n} \Rightarrow \underline{d} \rhd \underline{c} \Rightarrow \underline{e} \rhd \underline{d} \Rightarrow \underline{e} \gg \underline{e}; \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \forall \underline{e}\colon \dot{\neg}\,(\underline{a})\text{n} \Rightarrow \underline{b} \vdash \dot{\neg}\,(\underline{c})\text{n} \Rightarrow \underline{d} \vdash \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{e} \vdash \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{e} \vdash$

$\dot{\neg}(\underline{a})n \vdash \mathrm{NegateDisjunct1} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \rhd \dot{\neg}(\underline{a})n \gg \underline{b}; \mathrm{MP} \rhd \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{e} \rhd \underline{b} \gg \underline{c} \Rightarrow \underline{e}; \mathrm{MP} \rhd \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{e} \rhd \underline{b} \gg \underline{d} \Rightarrow \underline{e}; \mathrm{FromDisjuncts} \rhd \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \rhd \underline{c} \Rightarrow \underline{e} \rhd \underline{d} \Rightarrow \underline{e} \gg \underline{e}; \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \forall \underline{e}\colon \mathrm{Ded} \rhd \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \forall \underline{e}\colon \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \vdash \underline{a} \Rightarrow \underline{c} \Rightarrow \underline{e} \vdash \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{e} \vdash \underline{a} \vdash \underline{e} \gg \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \Rightarrow \underline{a} \Rightarrow \underline{c} \Rightarrow \underline{e} \Rightarrow \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{e} \Rightarrow \underline{a} \Rightarrow \underline{e}; \mathrm{Ded} \rhd \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \forall \underline{e}\colon \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \vdash \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{e} \vdash \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{e} \vdash \dot{\neg}(\underline{a})n \vdash \underline{e} \gg \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \Rightarrow \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \Rightarrow \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{e} \Rightarrow \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{e} \Rightarrow \dot{\neg}(\underline{a})n \Rightarrow \underline{e}; \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \vdash \underline{a} \Rightarrow \underline{c} \Rightarrow \underline{e} \vdash \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{e} \vdash \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{e} \vdash \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{e} \vdash \mathrm{MP3} \rhd \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \Rightarrow \underline{a} \Rightarrow \underline{c} \Rightarrow \underline{e} \Rightarrow \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{e} \Rightarrow \underline{a} \Rightarrow \underline{e} \rhd \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \rhd \underline{a} \Rightarrow \underline{c} \Rightarrow \underline{e} \rhd \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{e} \gg \underline{a} \Rightarrow \underline{e}; \mathrm{MP4} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \Rightarrow \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \Rightarrow \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{e} \Rightarrow \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{e} \Rightarrow \dot{\neg}(\underline{a})n \Rightarrow \underline{e} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \rhd \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \rhd \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{e} \rhd \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{e} \gg \dot{\neg}(\underline{a})n \Rightarrow \underline{e}; \mathrm{FromNegations} \rhd \underline{a} \Rightarrow \underline{e} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{e} \gg \underline{e}\rceil, p_0, c)]$

$[\mathrm{From2} * \mathrm{2Disjuncts} \stackrel{\mathrm{stmt}}{\to} \mathrm{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \forall \underline{c}\colon \forall \underline{d}\colon \forall \underline{e}\colon \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \vdash \underline{a} \Rightarrow \underline{c} \Rightarrow \underline{e} \vdash \underline{a} \Rightarrow \underline{d} \Rightarrow \underline{e} \vdash \underline{b} \Rightarrow \underline{c} \Rightarrow \underline{e} \vdash \underline{b} \Rightarrow \underline{d} \Rightarrow \underline{e} \vdash \underline{e}]$

$[\mathrm{From2} * \mathrm{2Disjuncts} \stackrel{\mathrm{tex}}{\to}$ "From2∗2Disjuncts"]

$[\mathrm{From2} * \mathrm{2Disjuncts} \stackrel{\mathrm{pyk}}{\to}$ "prop lemma from two times two disjuncts"]

NegateDisjunct1

$[\mathrm{NegateDisjunct1} \stackrel{\mathrm{proof}}{\to} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{a})n \vdash \mathrm{Repetition} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \gg \dot{\neg}(\underline{a})n \Rightarrow \underline{b}; \mathrm{MP} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \rhd \dot{\neg}(\underline{a})n \gg \underline{b}\rceil, p_0, c)]$

$[\mathrm{NegateDisjunct1} \stackrel{\mathrm{stmt}}{\to} \mathrm{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{a})n \vdash \underline{b}]$

$[\mathrm{NegateDisjunct1} \stackrel{\mathrm{tex}}{\to}$ "NegateDisjunct1"]

$[\mathrm{NegateDisjunct1} \stackrel{\mathrm{pyk}}{\to}$ "prop lemma negate first disjunct"]

NegateDisjunct2

$[\mathrm{NegateDisjunct2} \stackrel{\mathrm{proof}}{\to} \lambda c.\lambda x.\mathcal{P}(\lceil \mathrm{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{b})n \vdash \mathrm{Repetition} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \gg \dot{\neg}(\underline{a})n \Rightarrow \underline{b}; \mathrm{NegativeMT} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \rhd \dot{\neg}(\underline{b})n \gg \underline{a}\rceil, p_0, c)]$

$[\mathrm{NegateDisjunct2} \stackrel{\mathrm{stmt}}{\to} \mathrm{SystemQ} \vdash \forall \underline{a}\colon \forall \underline{b}\colon \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{b})n \vdash \underline{a}]$

$[\mathrm{NegateDisjunct2} \stackrel{\mathrm{tex}}{\to}$ "NegateDisjunct2"]

$[\mathrm{NegateDisjunct2} \stackrel{\mathrm{pyk}}{\to}$ "prop lemma negate second disjunct"]

ExpandDisjuncts

[ExpandDisjuncts $\stackrel{\text{proof}}{\rightarrow}$ $\lambda c.\lambda x.\mathcal{P}(\lceil \text{SystemQ} \vdash \forall \underline{a}: \forall \underline{b}: \forall \underline{c}: \forall \underline{d}: \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \vdash \dot{\neg}(\underline{b})n \vdash \dot{\neg}(\underline{d})n \vdash \text{NegateDisjunct2} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \rhd \dot{\neg}(\underline{b})n \gg \underline{a}; \text{NegateDisjunct2} \rhd \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \rhd \dot{\neg}(\underline{d})n \gg \underline{c}; \text{JoinConjuncts} \rhd \underline{a} \rhd \underline{c} \gg \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{c})n)n; \forall \underline{a}: \forall \underline{b}: \forall \underline{c}: \forall \underline{d}: \text{Ded} \rhd \forall \underline{a}: \forall \underline{b}: \forall \underline{c}: \forall \underline{d}: \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \vdash \dot{\neg}(\underline{b})n \vdash \dot{\neg}(\underline{d})n \vdash \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{c})n)n \gg \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \Rightarrow \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \Rightarrow \dot{\neg}(\underline{b})n \Rightarrow \dot{\neg}(\underline{d})n \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{c})n)n; \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \vdash \text{MP2} \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \Rightarrow \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \Rightarrow \dot{\neg}(\underline{b})n \Rightarrow \dot{\neg}(\underline{d})n \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{c})n)n \rhd \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \rhd \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \gg \dot{\neg}(\underline{b})n \Rightarrow \dot{\neg}(\underline{d})n \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{c})n)n; \text{Repetition} \rhd \dot{\neg}(\underline{b})n \Rightarrow \dot{\neg}(\underline{d})n \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{c})n)n \gg \dot{\neg}(\underline{b})n \Rightarrow \dot{\neg}(\underline{d})n \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{c})n)n \rceil, p_0, c)$]

[ExpandDisjuncts $\stackrel{\text{stmt}}{\rightarrow}$ $\text{SystemQ} \vdash \forall \underline{a}: \forall \underline{b}: \forall \underline{c}: \forall \underline{d}: \dot{\neg}(\underline{a})n \Rightarrow \underline{b} \vdash \dot{\neg}(\underline{c})n \Rightarrow \underline{d} \vdash \dot{\neg}(\underline{b})n \Rightarrow \dot{\neg}(\underline{d})n \Rightarrow \dot{\neg}(\underline{a} \Rightarrow \dot{\neg}(\underline{c})n)n$]

[ExpandDisjuncts $\stackrel{\text{tex}}{\rightarrow}$ “ExpandDisjuncts”]

[ExpandDisjuncts $\stackrel{\text{pyk}}{\rightarrow}$ “prop lemma expand disjuncts”]

SENC1

[SENC1 $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[SENC1 $\stackrel{\text{stmt}}{\rightarrow}$ $\text{SystemQ} \vdash \forall \underline{(fx)}: \forall \underline{(rx)}: \forall \underline{(ry)}: \underline{(rx)} == \underline{(ry)} \vdash \underline{(fx)} \in \underline{(rx)} \vdash \underline{(fx)} \in \underline{(ry)}$]

[SENC1 $\stackrel{\text{tex}}{\rightarrow}$ “SENC1”]

[SENC1 $\stackrel{\text{pyk}}{\rightarrow}$ “lemma set equality nec condition(1)”]

SENC2

[SENC2 $\stackrel{\text{proof}}{\rightarrow}$ Rule tactic]

[SENC2 $\stackrel{\text{stmt}}{\rightarrow}$ $\text{SystemQ} \vdash \forall \underline{(fx)}: \forall \underline{(rx)}: \forall \underline{(ry)}: \underline{(rx)} == \underline{(ry)} \vdash \underline{(fx)} \in \underline{(ry)} \vdash \underline{(fx)} \in \underline{(rx)}$]

[SENC2 $\stackrel{\text{tex}}{\rightarrow}$ “SENC2”]

[SENC2 $\stackrel{\text{pyk}}{\rightarrow}$ “lemma set equality nec condition(2)”]

LessLeq(R)

[LessLeq(R) $\stackrel{\text{tex}}{\rightarrow}$ “LessLeq(R)”]

[LessLeq(R) $\stackrel{\text{pyk}}{\to}$ "lemma lessLeq(R)"]

MemberOfSeries

[MemberOfSeries $\stackrel{\text{tex}}{\to}$ "MemberOfSeries"]

[MemberOfSeries $\stackrel{\text{pyk}}{\to}$ "lemma memberOfSeries"]

memberOfSeries(Type)

[memberOfSeries(Type) $\stackrel{\text{tex}}{\to}$ "memberOfSeries(Type)"]

[memberOfSeries(Type) $\stackrel{\text{pyk}}{\to}$ "lemma memberOfSeries(Type)"]

$*(\mathrm{exp})*$

[x(exp)y $\stackrel{\text{tex}}{\to}$ " #1.
(exp) #2."]

[$*$(exp)$*$ $\stackrel{\text{pyk}}{\to}$ "" ^ ""]

R($*$)

[R(x) $\stackrel{\text{tex}}{\to}$ "R(#1.
)"]

[R($*$) $\stackrel{\text{pyk}}{\to}$ "R(")"]

$--$ R($*$)

[$--$ R(x) $\stackrel{\text{tex}}{\to}$ "--R(#1.
)"]

[$--$ R($*$) $\stackrel{\text{pyk}}{\to}$ "--R(")"]

rec$*$

[recx $\stackrel{\text{tex}}{\to}$ "rec#1."]

$[\text{rec}* \overset{\text{pyk}}{\to}$ "1/ ""]

$*/*$

$[\mathsf{bs/r} \overset{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathsf{bs/r} \ddot{=} \{\text{ph} \in \text{P}(\mathsf{bs}) \mid \text{Ex}_{20} \in \mathsf{bs} \dot{\wedge} [\text{Ex}_{20} \in \mathsf{bs}]_{\mathsf{r}} == \text{ph}_2\}]\rceil)]$

$[\mathsf{x/y} \overset{\text{tex}}{\to}$ "#1.
/ #2."]

$[*/* \overset{\text{pyk}}{\to}$ "eq-system of " modulo ""]

$* \cap *$

$[\mathsf{x} \cap \mathsf{y} \overset{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathsf{x} \cap \mathsf{y} \ddot{=} \{\text{ph} \in \mathsf{x} \cup \mathsf{y} \mid \text{ph}_3 \in \mathsf{x} \dot{\wedge} \text{ph}_3 \in \mathsf{y}\}]\rceil)]$

$[\mathsf{x} \cap \mathsf{y} \overset{\text{tex}}{\to}$ "#1.
\cap #2."]

$[* \cap * \overset{\text{pyk}}{\to}$ "intersection " comma " end intersection"]

$*[*]$

$[\mathsf{x}[\mathsf{y}] \overset{\text{tex}}{\to}$ "#1.
[#2.
]"]

$[*[*] \overset{\text{pyk}}{\to}$ "[" ; "]"]

$\bigcup *$

$[\cup \mathsf{x} \overset{\text{tex}}{\to}$ "\cup #1."]

$[\cup * \overset{\text{pyk}}{\to}$ "union " end union"]

$* \cup *$

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

$[\mathsf{x} \cup \mathsf{y} \overset{\text{tex}}{\to}$ "#1.
\mathrel{\cup} #2."]

$[* \cup * \stackrel{\text{pyk}}{\to}$ "binary-union " comma " end union"]

P(∗)

$[\mathrm{P}(\mathsf{x}) \stackrel{\text{tex}}{\to}$ "P(#1.
)"]

$[\mathrm{P}(*) \stackrel{\text{pyk}}{\to}$ "power " end power"]

{∗}

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

$[\{\mathsf{x}\} \stackrel{\text{tex}}{\to}$ "\{#1.
\}"]

$[\{*\} \stackrel{\text{pyk}}{\to}$ "zermelo singleton " end singleton"]

StateExpand(∗, ∗, ∗)

$[\mathrm{StateExpand}(\mathsf{t}, \mathsf{s}, \mathsf{c}) \stackrel{\text{tex}}{\to}$ "StateExpand(#1.
, #2.
, #3.
)"]

$[\mathrm{StateExpand}(*, *, *) \stackrel{\text{pyk}}{\to}$ "stateExpand(" , " , ")"]

extractSeries(∗)

$[\mathrm{extractSeries}(\mathsf{t}) \stackrel{\text{tex}}{\to}$ "extractSeries(#1.
)"]

$[\mathrm{extractSeries}(*) \stackrel{\text{pyk}}{\to}$ "extractSeries(")"]

SetOfSeries(∗)

$[\mathrm{SetOfSeries}(\mathsf{x}) \stackrel{\text{tex}}{\to}$ "SetOfSeries(#1.
)"]

$[\mathrm{SetOfSeries}(*) \stackrel{\text{pyk}}{\to}$ "setOfSeries(")"]

$- -$ Macro($*$)

[$- -$ Macro(x) $\stackrel{\text{tex}}{\rightarrow}$ “--Macro(#1.
)”]

[$- -$ Macro($*$) $\stackrel{\text{pyk}}{\rightarrow}$ “--Macro(")”]

ExpandList($*, *, *$)

[ExpandList($\mathsf{x}, \mathsf{y}, \mathsf{z}$) $\stackrel{\text{tex}}{\rightarrow}$ “ExpandList(#1.
, #2.
, #3.
)”]

[ExpandList($*, *, *$) $\stackrel{\text{pyk}}{\rightarrow}$ “expandList(" , " , ")”]

$* *$ Macro($*$)

[$* *$ Macro(x) $\stackrel{\text{tex}}{\rightarrow}$ “$**$Macro(#1.
)”]

[$* *$ Macro($*$) $\stackrel{\text{pyk}}{\rightarrow}$ “$**$Macro(")”]

$+ +$ Macro($*$)

[$+ +$ Macro(x) $\stackrel{\text{tex}}{\rightarrow}$ “++Macro(#1.
)”]

[$+ +$ Macro($*$) $\stackrel{\text{pyk}}{\rightarrow}$ “++Macro(")”]

$<<$ Macro($*$)

[$<<$ Macro(x) $\stackrel{\text{tex}}{\rightarrow}$ “$<<$Macro(#1.
)”]

[$<<$ Macro($*$) $\stackrel{\text{pyk}}{\rightarrow}$ “$<<$Macro(")”]

$||\text{Macro}(*)$

[$||\text{Macro}(\mathsf{x}) \stackrel{\text{tex}}{\to}$ "||Macro(#1.
)"]

[$||\text{Macro}(*) \stackrel{\text{pyk}}{\to}$ "||Macro(")"]

$01//\text{Macro}(*)$

[$01//\text{Macro}(\mathsf{x}) \stackrel{\text{tex}}{\to}$ "01//Macro(#1.
)"]

[$01//\text{Macro}(*) \stackrel{\text{pyk}}{\to}$ "01//Macro(")"]

$\text{UB}(*, *)$

[$\text{UB}(\mathsf{x}, \mathsf{y}) \stackrel{\text{tex}}{\to}$ "UB(#1.
, #2.
)"]

[$\text{UB}(*, *) \stackrel{\text{pyk}}{\to}$ "upperBound(" , ")"]

$\text{LUB}(*, *)$

[$\text{LUB}(\mathsf{x}, \mathsf{y}) \stackrel{\text{tex}}{\to}$ "LUB(#1.
, #2.
)"]

[$\text{LUB}(*, *) \stackrel{\text{pyk}}{\to}$ "leastUpperBound(" , ")"]

$\text{BS}(*, *)$

[$\text{BS}(\mathsf{x}, \mathsf{y}) \stackrel{\text{tex}}{\to}$ "BS(#1.
, #2.
)"]

[$\text{BS}(*, *) \stackrel{\text{pyk}}{\to}$ "base(1/2)Sum(" , ")"]

UStelescope(∗, ∗)

$[\mathrm{UStelescope}(\mathsf{x}, \mathsf{y}) \stackrel{\text{tex}}{\rightarrow}$ "UStelescope(#1.
, #2.
)"]

$[\mathrm{UStelescope}(*, *) \stackrel{\text{pyk}}{\rightarrow}$ "UStelescope(" , ")"]

(∗)

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

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

$[(*) \stackrel{\text{pyk}}{\rightarrow}$ "(")"]

|f ∗ |

$[|\mathrm{f}\mathsf{x}| \stackrel{\text{tex}}{\rightarrow}$ "|f#1.
|"]

$[|\mathrm{f} * | \stackrel{\text{pyk}}{\rightarrow}$ "|f " |"]

|r ∗ |

$[|\mathrm{r}\mathsf{x}| \stackrel{\text{tex}}{\rightarrow}$ "|r#1.
|"]

$[|\mathrm{r} * | \stackrel{\text{pyk}}{\rightarrow}$ "|r " |"]

Limit(∗, ∗)

$[\mathrm{Limit}(\mathsf{x}, \mathsf{y}) \stackrel{\text{tex}}{\rightarrow}$ "Limit(#1.
, #2.
)"]

$[\mathrm{Limit}(*, *) \stackrel{\text{pyk}}{\rightarrow}$ "limit(" , ")"]

Union(∗)

[Union(x) $\stackrel{\text{tex}}{\to}$ "Union(#1.
)"]

[Union(∗) $\stackrel{\text{pyk}}{\to}$ "U(")"]

IsOrderedPair(∗, ∗, ∗)

[IsOrderedPair(x, y, z) $\stackrel{\text{tex}}{\to}$ "IsOrderedPair(#1.
, #2.
, #3.
)"]

[IsOrderedPair(∗, ∗, ∗) $\stackrel{\text{pyk}}{\to}$ "isOrderedPair(" , " , ")"]

IsRelation(∗, ∗, ∗)

[IsRelation(x, y, z) $\stackrel{\text{tex}}{\to}$ "IsRelation(#1.
, #2.
, #3.
)"]

[IsRelation(∗, ∗, ∗) $\stackrel{\text{pyk}}{\to}$ "isRelation(" , " , ")"]

isFunction(∗, ∗, ∗)

[isFunction(x, y, z) $\stackrel{\text{tex}}{\to}$ "isFunction(#1.
, #2.
, #3.
)"]

[isFunction(∗, ∗, ∗) $\stackrel{\text{pyk}}{\to}$ "isFunction(" , " , ")"]

IsSeries(∗, ∗)

[IsSeries(x, y) $\stackrel{\text{tex}}{\to}$ "IsSeries(#1.
, #2.
)"]

[IsSeries(∗, ∗) $\stackrel{\text{pyk}}{\to}$ "isSeries(" , ")"]

IsNatural(∗, ∗)

[IsNatural(xy, ∗) $\stackrel{\text{tex}}{\rightarrow}$ "IsNatural(#1.
, #2.
)"]

[IsNatural(∗, ∗) $\stackrel{\text{pyk}}{\rightarrow}$ "isNatural(")"]

OrderedPair(∗, ∗)

[OrderedPair(x, y) $\stackrel{\text{tex}}{\rightarrow}$ "OrderedPair(#1.
, #2.
)"]

[OrderedPair(∗, ∗) $\stackrel{\text{pyk}}{\rightarrow}$ "(o " , ")"]

TypeNat(∗)

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

[TypeNat(∗) $\stackrel{\text{pyk}}{\rightarrow}$ "typeNat(")"]

TypeNat0(∗)

[TypeNat0(x) $\stackrel{\text{tex}}{\rightarrow}$ "TypeNat0(#1.
)"]

[TypeNat0(∗) $\stackrel{\text{pyk}}{\rightarrow}$ "typeNat0(")"]

TypeRational(∗)

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

[TypeRational(∗) $\stackrel{\text{pyk}}{\rightarrow}$ "typeRational(")"]

TypeRational0(∗)

[TypeRational0(x) $\stackrel{\text{tex}}{\to}$ "TypeRational0(#1.
)"]

[TypeRational0(∗) $\stackrel{\text{pyk}}{\to}$ "typeRational0(")"]

TypeSeries(∗, ∗)

[TypeSeries(x, y) $\stackrel{\text{tex}}{\to}$ "TypeSeries(#1.
, #2.
)"]

[TypeSeries(∗, ∗) $\stackrel{\text{pyk}}{\to}$ "typeSeries(" , ")"]

Typeseries0(∗, ∗)

[Typeseries0(x, y) $\stackrel{\text{tex}}{\to}$ "Typeseries0(#1.
, #2.
)"]

[Typeseries0(∗, ∗) $\stackrel{\text{pyk}}{\to}$ "typeSeries0(" , ")"]

{∗, ∗}

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

[{∗, ∗} $\stackrel{\text{pyk}}{\to}$ "zermelo pair " comma " end pair"]

⟨∗, ∗⟩

[$\langle x, y\rangle \stackrel{\text{macro}}{\to} \lambda t.\lambda s.\lambda c.\tilde{\mathcal{M}}_4(t, s, c, \lceil [\langle x, y\rangle \ddot{=} \{\{x\}, \{x, y\}\}]\rceil)$]

[⟨x, y⟩ $\stackrel{\text{tex}}{\to}$ "\langle #1.
, #2.
\rangle"]

[⟨∗, ∗⟩ $\stackrel{\text{pyk}}{\to}$ "zermelo ordered pair " comma " end pair"]

$(-\mathrm{u}*)$

$[(-\mathrm{u}\mathsf{x}) \stackrel{\text{tex}}{\to}$ "(-u#1.
)"]

$[(-\mathrm{u}*) \stackrel{\text{pyk}}{\to}$ "- ""]

$-_{\mathrm{f}}*$

$[-_{\mathrm{f}}\mathsf{x} \stackrel{\text{tex}}{\to}$ "-_{f}#1."]

$[-_{\mathrm{f}}* \stackrel{\text{pyk}}{\to}$ "-f ""]

$(- - *)$

$[(- - \mathsf{x}) \stackrel{\text{tex}}{\to}$ "(--#1.
)"]

$[(- - *) \stackrel{\text{pyk}}{\to}$ "-- ""]

1f/*

[1f/x $\stackrel{\text{tex}}{\to}$ "1f/#1."]

[1f/* $\stackrel{\text{pyk}}{\to}$ "1f/ ""]

01//temp*

[01//tempx $\stackrel{\text{tex}}{\to}$ "01//temp#1."]

[01//temp* $\stackrel{\text{pyk}}{\to}$ "01// ""]

$*(*, *)$

$[\mathsf{r}(\mathsf{x},\mathsf{y}) \stackrel{\text{macro}}{\to} \lambda\mathsf{t}.\lambda\mathsf{s}.\lambda\mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathsf{r}(\mathsf{x},\mathsf{y}) \ddot{=} \langle\mathsf{x},\mathsf{y}\rangle \in \mathsf{r}]\rceil)]$

$[\mathsf{z}(\mathsf{x},\mathsf{y}) \stackrel{\text{tex}}{\to}$ "#3.
(#1.
, #2.
)"]

$[*(*, *) \stackrel{\text{pyk}}{\rightarrow}$ “" is related to " under "”]

ReflRel$(*, *)$

$[\text{ReflRel}(\mathsf{r}, \mathsf{x}) \stackrel{\text{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [\text{ReflRel}(\mathsf{r}, \mathsf{x}) \ddot{=} \forall s\colon (s \in \mathsf{x} \Rightarrow \mathsf{r}(s, s))]\rceil)]$

[ReflRel$(\mathsf{r}, \mathsf{x}) \stackrel{\text{tex}}{\rightarrow}$ “ReflRel(#1.
, #2.
)”]

[ReflRel$(*, *) \stackrel{\text{pyk}}{\rightarrow}$ “" is reflexive relation in "”]

SymRel$(*, *)$

$[\text{SymRel}(\mathsf{r}, \mathsf{x}) \stackrel{\text{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [\text{SymRel}(\mathsf{r}, \mathsf{x}) \ddot{=} \forall s, t\colon (s \in \mathsf{x} \Rightarrow t \in \mathsf{x} \Rightarrow \mathsf{r}(s, t) \Rightarrow \mathsf{r}(t, s))]\rceil)]$

[SymRel$(\mathsf{r}, \mathsf{x}) \stackrel{\text{tex}}{\rightarrow}$ “SymRel(#1.
, #2.
)”]

[SymRel$(*, *) \stackrel{\text{pyk}}{\rightarrow}$ “" is symmetric relation in "”]

TransRel$(*, *)$

$[\text{TransRel}(\mathsf{r}, \mathsf{x}) \stackrel{\text{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [\text{TransRel}(\mathsf{r}, \mathsf{x}) \ddot{=} \forall s, t, u\colon (s \in \mathsf{x} \Rightarrow t \in \mathsf{x} \Rightarrow u \in \mathsf{x} \Rightarrow \mathsf{r}(s, t) \Rightarrow \mathsf{r}(t, u) \Rightarrow \mathsf{r}(s, u))]\rceil)]$

[TransRel$(\mathsf{r}, \mathsf{x}) \stackrel{\text{tex}}{\rightarrow}$ “TransRel(#1.
, #2.
)”]

[TransRel$(*, *) \stackrel{\text{pyk}}{\rightarrow}$ “" is transitive relation in "”]

EqRel$(*, *)$

$[\text{EqRel}(\mathsf{r}, \mathsf{x}) \stackrel{\text{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil [\text{EqRel}(\mathsf{r}, \mathsf{x}) \ddot{=} \text{ReflRel}(\mathsf{r}, \mathsf{x}) \dot{\wedge} \text{SymRel}(\mathsf{r}, \mathsf{x}) \dot{\wedge} \text{TransRel}(\mathsf{r}, \mathsf{x})]\rceil)]$

[EqRel$(\mathsf{r}, \mathsf{x}) \stackrel{\text{tex}}{\rightarrow}$ “EqRel(#1.
, #2.
)”]

[EqRel(*, *) $\stackrel{\text{pyk}}{\to}$ “" is equivalence relation in "”]

$[* \in *]_*$

$[[\mathsf{x} \in \mathsf{bs}]_\mathsf{r} \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[[\mathsf{x} \in \mathsf{bs}]_\mathsf{r} \doteq \{\mathrm{ph} \in \mathsf{bs} \mid \mathsf{r}(\mathrm{ph}_1, \mathsf{x})\}]\rceil)]$

$[[\mathsf{x} \in \mathsf{bs}]_\mathsf{r} \stackrel{\text{tex}}{\to}$ “[#1.
\mathrel{\in} #2.
]_{#3.
}”]

$[[* \in *]_* \stackrel{\text{pyk}}{\to}$ “equivalence class of " in " modulo "”]

Partition(*, *)

$[\mathrm{Partition}(\mathsf{p}, \mathsf{bs}) \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t}, \mathsf{s}, \mathsf{c}, \lceil[\mathrm{Partition}(\mathsf{p}, \mathsf{bs}) \doteq (\forall s\colon (s \in \mathsf{p} \Rightarrow s \neq$
$\emptyset)) \dot{\wedge}$
$(\forall s, t\colon (s \in \mathsf{p} \Rightarrow t \in \mathsf{p} \Rightarrow s \neq t \Rightarrow s \cap t == \emptyset)) \dot{\wedge}$
$\cup\, \mathsf{p} == \mathsf{bs}]\rceil)]$

$[\mathrm{Partition}(\mathsf{x}, \mathsf{y}) \stackrel{\text{tex}}{\to}$ “Partition(#1.
, #2.
)”]

$[\mathrm{Partition}(*, *) \stackrel{\text{pyk}}{\to}$ “" is partition of "”]

$(* * *)$

$[(\mathsf{x} * \mathsf{y}) \stackrel{\text{tex}}{\to}$ “(#1.
*#2.
)”]

$[(* * *) \stackrel{\text{pyk}}{\to}$ “" * "”]

$* *_\mathrm{f} *$

$[(\mathrm{fx}) *_\mathrm{f} (\mathrm{fy}) \stackrel{\text{tex}}{\to}$ “#1.
*_{f}#2.”]

$[* *_\mathrm{f} * \stackrel{\text{pyk}}{\to}$ “" *f "”]

$* * **$

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

$[* * ** \stackrel{\text{pyk}}{\rightarrow}$ "" ** ""]

$(* + *)$

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

$[(* + *) \stackrel{\text{pyk}}{\rightarrow}$ "" + ""]

$(* - *)$

$[(x - y) \stackrel{\text{macro}}{\rightarrow} \lambda t.\lambda s.\lambda c.\tilde{\mathcal{M}}_4(t, s, c, \lceil[(x - y) \ddot{=} (x + (-uy))]\rceil)]$

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

$[(* - *) \stackrel{\text{pyk}}{\rightarrow}$ "" - ""]

$* +_{\mathrm{f}} *$

$[(\mathrm{fx}) +_{\mathrm{f}} (\mathrm{fy}) \stackrel{\text{tex}}{\rightarrow}$ "#1.
+_{f}#2."]

$[* +_{\mathrm{f}} * \stackrel{\text{pyk}}{\rightarrow}$ "" +f ""]

$* -_{\mathrm{f}} *$

$[(\mathrm{fx}) -_{\mathrm{f}} (\mathrm{fy}) \stackrel{\text{tex}}{\rightarrow}$ "#1.
-_{f}#2."]

$[* -_{\mathrm{f}} * \stackrel{\text{pyk}}{\rightarrow}$ "" -f ""]

$* + +*$

[$\mathsf{x} + +\mathsf{y} \stackrel{\text{tex}}{\to}$ "#1.
++#2."]

[$* + +* \stackrel{\text{pyk}}{\to}$ "" ++ ""]

$\mathrm{R}(*) - -\mathrm{R}(*)$

[$\mathrm{R}((\mathrm{fx})) - -\mathrm{R}((\mathrm{fy})) \stackrel{\text{tex}}{\to}$ "R(#1.
) -- R(#2.
)"]

[$\mathrm{R}(*) - -\mathrm{R}(*) \stackrel{\text{pyk}}{\to}$ "R(") -- R(")"]

$* \in *$

[$\mathsf{x} \in \mathsf{y} \stackrel{\text{tex}}{\to}$ "#1.
\mathrel{\in} #2."]

[$* \in * \stackrel{\text{pyk}}{\to}$ "" in0 ""]

$|*|$

[$|\mathsf{x}| \stackrel{\text{tex}}{\to}$ "|#1.
|"]

[$|*| \stackrel{\text{pyk}}{\to}$ "| " |"]

$\mathrm{if}(*, *, *)$

[$\mathrm{if}(\mathsf{x}, \mathsf{y}, \mathsf{z}) \stackrel{\text{tex}}{\to}$ "if(#1.
, #2.
, #3.
)"]

[$\mathrm{if}(*, *, *) \stackrel{\text{pyk}}{\to}$ "if(" , " , ")"]

Max(∗, ∗)

[Max(x, y) $\stackrel{\text{tex}}{\to}$ "Max(#1.
, #2.
)"]

[Max(∗, ∗) $\stackrel{\text{pyk}}{\to}$ "max(" , ")"]

Max(∗, ∗)

[Max(x, y) $\stackrel{\text{tex}}{\to}$ "Max(#1.
, #2.
)"]

[Max(∗, ∗) $\stackrel{\text{pyk}}{\to}$ "maxR(" , ")"]

$* = *$

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

[$* = *$ $\stackrel{\text{pyk}}{\to}$ "" = ""]

$* \neq *$

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

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

[$* \neq *$ $\stackrel{\text{pyk}}{\to}$ "" != ""]

∗ <= ∗

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

[∗ <= ∗ $\stackrel{\text{pyk}}{\to}$ "" <= ""]

$* < *$

$[\mathsf{x} < \mathsf{y} \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathsf{x} < \mathsf{y} \stackrel{..}{=} \mathsf{x} <= \mathsf{y} \dot{\wedge} \mathsf{x} \neq \mathsf{y}]\rceil)]$

$[\mathsf{x} < \mathsf{y} \stackrel{\text{tex}}{\to}$ "#1.
< #2."]

$[* < * \stackrel{\text{pyk}}{\to}$ "" < ""]

$* <_{\mathrm{f}} *$

$[\mathsf{x} <_{\mathrm{f}} \mathsf{y} \stackrel{\text{tex}}{\to}$ "#1.
<_{f}#2."]

$[* <_{\mathrm{f}} * \stackrel{\text{pyk}}{\to}$ "" <f ""]

$* \leq_{\mathrm{f}} *$

$[(\mathrm{fx}) \leq_{\mathrm{f}} (\mathrm{fy}) \stackrel{\text{macro}}{\to} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[(\mathrm{fx}) \leq_{\mathrm{f}} (\mathrm{fy}) \stackrel{..}{=} (\mathrm{fx}) <_{\mathrm{f}} (\mathrm{fy}) \dot{\vee}$
$\mathrm{SF}((\mathrm{fx}),(\mathrm{fy}))]\rceil)]$

$[\mathsf{x} \leq_{\mathrm{f}} \mathsf{y} \stackrel{\text{tex}}{\to}$ "#1.
\leq_{f}#2."]

$[* \leq_{\mathrm{f}} * \stackrel{\text{pyk}}{\to}$ "" <=f ""]

SF(*, *)

$[\mathrm{SF}(\mathsf{x},\mathsf{y}) \stackrel{\text{tex}}{\to}$ "SF(#1.
, #2.
)"]

$[\mathrm{SF}(*,*) \stackrel{\text{pyk}}{\to}$ "" sameF ""]

$* == *$

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

$[* == * \stackrel{\text{pyk}}{\to}$ "" == ""]

$*!! == *$

$[x!! == y \stackrel{\text{macro}}{\to} \lambda t.\lambda s.\lambda c.\tilde{\mathcal{M}}_4(t, s, c, \lceil [x!! == y \ddot{=} \dot{\neg}\, (x == y)n] \rceil)]$

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

[*!! == * $\stackrel{\text{pyk}}{\to}$ "" !!== ""]

$* << *$

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

[* << * $\stackrel{\text{pyk}}{\to}$ "" << ""]

$* <<== *$

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

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

[* <<== * $\stackrel{\text{pyk}}{\to}$ "" <<== ""]

$*{==}*$

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

[*==* $\stackrel{\text{pyk}}{\to}$ "" zermelo is ""]

$* \subseteq *$

$[x \subseteq y \stackrel{\text{macro}}{\to} \lambda t.\lambda s.\lambda c.\tilde{\mathcal{M}}_4(t, s, c, \lceil [x \subseteq y \ddot{=} \forall (\mathrm{S1ob})\colon ((\mathrm{S1ob}) \in x \Rightarrow (\mathrm{S1ob}) \in y)] \rceil)]$

[x ⊆ y $\stackrel{\text{tex}}{\to}$ "#1.
\mathrel{\subseteq} #2."]

[* ⊆ * $\stackrel{\text{pyk}}{\to}$ "" is subset of ""]

$\dot{\neg}\,(*)\mathrm{n}$

$[\dot{\neg}\,(\mathsf{x})\mathrm{n} \overset{\mathrm{tex}}{\rightarrow}$ “\dot{\neg}\,(#1.
)n”]

$[\dot{\neg}\,(*)\mathrm{n} \overset{\mathrm{pyk}}{\rightarrow}$ “not0 "”]

$* \notin *$

$[\mathsf{x} \notin \mathsf{y} \overset{\mathrm{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathsf{x} \notin \mathsf{y} \ddot{=} \dot{\neg}\,(\mathsf{x} \in \mathsf{y})\mathrm{n}]\rceil)]$

$[\mathsf{x} \notin \mathsf{y} \overset{\mathrm{tex}}{\rightarrow}$ “#1.
\mathrel{\notin} #2.”]

$[* \notin * \overset{\mathrm{pyk}}{\rightarrow}$ “" zermelo ~in "”]

$* \neq *$

$[\mathsf{x} \neq \mathsf{y} \overset{\mathrm{macro}}{\rightarrow} \lambda \mathsf{t}.\lambda \mathsf{s}.\lambda \mathsf{c}.\tilde{\mathcal{M}}_4(\mathsf{t},\mathsf{s},\mathsf{c},\lceil[\mathsf{x} \neq \mathsf{y} \ddot{=} \dot{\neg}\,(\mathsf{x}{=}{=}\mathsf{y})\mathrm{n}]\rceil)]$

$[\mathsf{x} \neq \mathsf{y} \overset{\mathrm{tex}}{\rightarrow}$ “#1.
\mathrel{\neq} #2.”]

$[* \neq * \overset{\mathrm{pyk}}{\rightarrow}$ “" zermelo ~is "”]

$* \dot{\wedge} *$

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

$[\mathsf{x} \dot{\wedge} \mathsf{y} \overset{\mathrm{tex}}{\rightarrow}$ “#1.
\mathrel{\dot{\wedge}} #2.”]

$[* \dot{\wedge} * \overset{\mathrm{pyk}}{\rightarrow}$ “" and0 "”]

$* \dot{\vee} *$

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

$[\mathsf{x} \dot{\vee} \mathsf{y} \overset{\mathrm{tex}}{\rightarrow}$ “#1.
\mathrel{\dot{\vee}} #2.”]

$[* \dot{\vee} * \overset{\mathrm{pyk}}{\rightarrow}$ “" or0 "”]

$\exists * \colon *$

[$\exists$(v1): a $\stackrel{\text{macro}}{\to}$ λt.λs.λc.$\tilde{\mathcal{M}}_4$(t, s, c, $\lceil$[$\exists$(v1): a $\ddot{=}$ $\dot{\neg}$ ($\forall$(v1): $\dot{\neg}$ (a)n)n]$\rceil$)]

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

[$\exists * \colon *$ $\stackrel{\text{pyk}}{\to}$ "exist0 " indeed ""]

$* \dot{\Leftrightarrow} *$

[x $\dot{\Leftrightarrow}$ y $\stackrel{\text{macro}}{\to}$ λt.λs.λc.$\tilde{\mathcal{M}}_4$(t, s, c, $\lceil$[x $\dot{\Leftrightarrow}$ y $\ddot{=}$ (x $\Rightarrow$ y) $\dot{\wedge}$ (y $\Rightarrow$ x)]$\rceil$)]

[x $\dot{\Leftrightarrow}$ y $\stackrel{\text{tex}}{\to}$ "#1.
\mathrel{\dot{\Leftrightarrow}} #2."]

[$* \dot{\Leftrightarrow} *$ $\stackrel{\text{pyk}}{\to}$ "" iff ""]

$\{\text{ph} \in * \mid *\}$

[{ph $\in$ x | a} $\stackrel{\text{tex}}{\to}$ " \{ ph \mathrel{\in} #1.
\mid #2.
\}"]

[{ph $\in$ * | *} $\stackrel{\text{pyk}}{\to}$ "the set of ph in " such that " end set"]

The pyk compiler, version 0.grue.20060417+ by Klaus Grue
GRD-2006-12-15.UTC:00:19:10.164930 = MJD-54084.TAI:00:19:43.164930 = LGT-4672858783164930e-6