Theorema 2.0: A First Tour

NB reached List of cells reached CellGroupData reached List of cells reached Null Cell reached

We consider “proving”, “computing”, and “solving” as the three basic mathematical activities.

CellGroupData reached List of cells reached

1 Proving

We want to prove

$$(\underset{x}{\forall}(P[x] \vee Q[x])) \wedge (\underset{y}{\forall}(P[y] \Rightarrow Q[y])) \Leftrightarrow (\underset{x}{\forall} Q[x]).$$

To prove a formula like the above, we need to enter it in the context of a Theorema environment.

1.1 Proposition (First Test, 2014)

IffTM{ AndTM{ ForallTM{ RNGTM{ SIMPRNGTM{ VARTM{x}}}}}{ OrTM{ P[VARTM{x}]}{ Q[VARTM{x}]}}}{ ForallTM{ RNGTM{ SIMPRNGTM{ VARTM{y}}}}{ ImpliesTM{ P[VARTM{y}]}{ Q[VARTM{y}]}}}}{ ForallTM{ RNGTM{ SIMPRNGTM{ VARTM{x}}}}{ Q[VARTM{x}]}}

Cell reached CellGroupData reached List of cells reached Cell reached Cell reached Cell reached Cell reached Cell reached Cell reached Cell reached Cell reached Cell reached Cell reached CellGroupData reached List of cells reached

2 Computing

CellGroupData reached List of cells reached Cell reached

2.0.1 Global Declaration

$$\underset{\substack{a,b \\ a=b}}{\forall}$$

2.1 [?]

ForallTM{ RNGTM{ SIMPRNGTM{ VARTM{a}}}{ SIMPRNGTM{ VARTM{b}}}}{ IffDefTM{ AnnotatedTM{LessTM}{ SubScriptTM{lex}}{ VARTM{a}}{ VARTM{b}}}{ ExistsTM{ RNGTM{ STEPRNGTM}}{ AndTM{ LessTM{ SubscriptTM{ VARTM{a}}{ VARTM{i}}}{ SubscriptTM{ VARTM{b}}{ VARTM{i}}}}{ ForallTM{ RNGTM{ STEPRNGTM}}{ EqualTM{ SubscriptTM{ VARTM{a}}{ VARTM{j}}}{ SubscriptTM{ VARTM{b}}{ VARTM{j}}}}}}}}

■Cell reached CellGroupData reached List of cells reached Cell reached Cell reached CellGroupData reached List of cells reached Cell reached Cell reached CellGroupData reached List of cells reached Cell reached CellGroupData reached List of cells reached Cell reached

2.1.1 Global Declaration

$$\underset{K}{\forall}$$

2.1.2 Global Declaration

$$\text{Mon[K]}:=\underset{M}{\Delta}$$

2.1.3 Global Declaration

$$\underset{m1,m2}{\forall}$$

2.2 [?]

ForallTM{ RNGTM{ SIMPRNGTM{ VARTM{K}}}{ SIMPRNGTM{ VARTM{m2}}}}{ EqualDefTM{ DomainOperationTM{ Mon[VARTM{K}]}{TimesTM}{ VARTM{m1}}{ VARTM{m2}}}{ TupleTM{ DomainOperationTM{ VARTM{K}}{TimesTM}{ SubscriptTM{ VARTM{m1}}{1}}{ SubscriptTM{ VARTM{m2}}{1}}}{ TupleOfTM{ RNGTM{ STEPRNGTM}}{ DomainOperationTM{ IntegerIntervalTM}{PlusTM}{ SubscriptTM{ SubscriptTM{ VARTM{m1}}{2}}{ VARTM{i}}}{ SubscriptTM{ SubscriptTM{ VARTM{m2}}{2}}{ VARTM{i}}}}}}}

2.3 [?]

ForallTM{ RNGTM{ SIMPRNGTM{ VARTM{K}}}{ SIMPRNGTM{ VARTM{m2}}}{ IffDefTM{ DomainOperationTM{ Mon[VARTM{K}]}{LessTM}{ VARTM{m1}}{ VARTM{m2}}}{ AnnotatedTM{LessTM}{ SubScriptTM{lex}}{ SubscriptTM{ VARTM{m1}}{2}}{ SubscriptTM{ VARTM{m2}}{2}}}}

■Cell reached CellGroupData reached List of cells reached Cell reached Cell reached CellGroupData reached List of cells reached Cell reached Cell reached CellGroupData reached List of cells reached Cell reached Cell reached CellGroupData reached List of cells reached Cell reached Cell reached CellGroupData reached List of cells reached

3 Set Theory

CellGroupData reached List of cells reached Cell reached

3.0.1 Global Declaration

$$\underset{x,y}{\forall}$$

3.1 [?]

ForallTM{ RNGTM{ SIMPRNGTM{ VARTM{x}}}{ SIMPRNGTM{ VARTM{y}}}{ EqualDefTM{ SubsetEqualTM{ VARTM{x}}{ VARTM{y}}}{ ForallTM{ RNGTM{ SIMPRNGTM{ VARTM{z}}}{ ImpliesTM{ ElementTM{ VARTM{z}}{ VARTM{x}}}{ ElementTM{ VARTM{z}}{ VARTM{y}}}}}}}

■Cell reached

3.2 Proposition (transitivity of $\subseteq$)

ForallTM{ RNGTM{ SIMPRNGTM{ VARTM{a}}}{ SIMPRNGTM{ VARTM{c}}}}{ ImpliesTM{ AndTM{ SubsetEqualTM{ VARTM{a}}{ VARTM{b}}}{ SubsetEqualTM{ VARTM{b}}{ VARTM{c}}}}{ SubsetEqualTM{ VARTM{a}}{ VARTM{c}}}}

Cell reached CellGroupData reached List of cells reached Cell reached Cell reached CellGroupData reached List of cells reached Cell reached Cell reached