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)

Theorema‘Language‘IffTM[$Theorema$‘$Language$‘AndTM[Theorema‘Language‘ForallTM[$Theorema$‘$Langu
True, Theorema‘Language‘OrTM[$Theorema$‘$Knowledge$‘PTM[Theorema‘Language‘VAR[$Theorema$‘$Know
Theorema‘Knowledge‘QTM[$Theorema$‘$Language$‘VAR[Theorema‘Knowledge‘VARyTM]]]]],
Theorema‘Language‘ForallTM[$Theorema$‘$Language$‘RNG[Theorema‘Language‘SIMPRNG[$Theorema$‘$Lan
True, Theorema‘Knowledge‘QTM[$Theorema$‘$Language$‘VAR[Theorema‘Knowledge‘VARxTM]]]]

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2 Computing

CellGroupData reached List of cells reached Cell reached

2.0.1 Global Declaration

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

2.1 [?]

Theorema‘Language‘ForallTM[$Theorema‘Language‘RNG$[Theorema‘Language‘SIMPRNG[$Theorema‘Lan$
Theorema‘Language‘SIMPRNG[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARbTM]]],
Theorema‘Language‘EqualTM[$Theorema‘Language‘BracketingBar$TM[Theorema‘Language‘VAR[$Theore$
Theorema‘Language‘SubScriptTM[$Theorema‘Knowledge‘lex$TM]][Theorema‘Language‘VAR[$Theorema‘K$
Theorema‘Language‘ExistsTM[$Theorema‘Language‘RNG$[Theorema‘Language‘STEPRNG[$Theorema‘Lan$
1, Theorema‘Language‘BracketingBarTM[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARaTM]],
1]], True, Theorema‘Language‘AndTM[$Theorema‘Language‘Less$TM[Theorema‘Language‘SubscriptTM[T
Theorema‘Language‘VAR[$Theorema‘Knowledge‘VARiTM$]], $Theorema‘Language‘Subscript$TM[Theorema
Theorema‘Language‘ForallTM[$Theorema‘Language‘RNG$[Theorema‘Language‘STEPRNG[$Theorema‘Lan$
1, Theorema‘Language‘SubtractTM[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARiTM],
1], 1]], True, Theorema‘Language‘EqualTM[$Theorema‘Language‘Subscript$TM[Theorema‘Language‘VAR[T
Theorema‘Language‘SubscriptTM[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARbTM],
Theorema‘Language‘VAR[$Theorema‘Knowledge‘VARjTM$]]]]]]]

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2.1.1 Global Declaration

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

2.1.2 Global Declaration

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

2.1.3 Global Declaration

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

2.2 [?]

Theorema‘Language‘EqualDefTM[$Theorema‘Language‘DomainOperation$TM[Theorema‘Knowledge‘M$TM$
Theorema‘Language‘TupleTM[$Theorema‘Language‘DomainOperation$TM[Theorema‘Language‘K$TM, The$
1], Theorema‘Language‘SubscriptTM[$Theorema‘Knowledge‘m$2TM, 1]],
Theorema‘Language‘TupleOfTM[$Theorema‘Language‘RNG$[Theorema‘Language‘STEPRNG[$Theorema‘L$
1, Theorema‘Language‘BracketingBarTM[$Theorema‘Language‘Subscript$TM[Theorema‘Knowledge‘m1$TM$
Theorema‘Language‘SubscriptTM[$Theorema‘Language‘Subscript$TM[Theorema‘Knowledge‘m2$TM, 2], The$

2.3 [?]

Theorema‘Language‘IffDefTM[$Theorema‘Language‘DomainOperation$TM[Theorema‘Knowledge‘M$TM, T$
Theorema‘Language‘AnnotatedTM[$Theorema‘Language‘Less$TM,
Theorema‘Language‘SubScriptTM[$Theorema‘Knowledge‘lex$TM]][Theorema‘Language‘SubscriptTM[$Theo$
2], Theorema‘Language‘SubscriptTM[$Theorema‘Knowledge‘m$2TM, 2]]]

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3 Set Theory

CellGroupData reached List of cells reached Cell reached

3.0.1 Global Declaration

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

3.1 [?]

Theorema‘Language‘ForallTM[$Theorema‘Language‘RNG$[Theorema‘Language‘SIMPRNG[$Theorema‘Lan$
Theorema‘Language‘SIMPRNG[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARyTM]]],
True, Theorema‘Language‘EqualDefTM[$Theorema‘Language‘SubsetEqual$TM[Theorema‘Language‘VAR[T
Theorema‘Language‘ForallTM[$Theorema‘Language‘RNG$[Theorema‘Language‘SIMPRNG[$Theorema‘Lan$
True, Theorema‘Language‘ImpliesTM[$Theorema‘Language‘Element$TM[Theorema‘Language‘VAR[$Theore$
Theorema‘Language‘ElementTM[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARzTM],
Theorema‘Language‘VAR[$Theorema‘Knowledge‘VARyTM$]]]]]]

■Cell reached

3.2 Proposition (transitivity of $\subseteq$)

Theorema‘Language‘ForallTM[$Theorema‘Language‘RNG$[Theorema‘Language‘SIMPRNG[$Theorema‘Lan$
Theorema‘Language‘SIMPRNG[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARbTM]],
Theorema‘Language‘SIMPRNG[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARcTM]]],
True, Theorema‘Language‘ImpliesTM[$Theorema‘Language‘And$TM[Theorema‘Language‘SubsetEqualTM[
Theorema‘Language‘VAR[$Theorema‘Knowledge‘VAR$bTM]], $Theorema‘Language‘SubsetEqual$TM[Theor
Theorema‘Language‘SubsetEqualTM[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARaTM],
Theorema‘Language‘VAR[$Theorema‘Knowledge‘VAR$cTM]]]]

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