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)

∀RNG (SIMPRNG (*Theorema‘Knowledge‘VAR* x*TM*, *P* (*Theorema‘Knowledge‘VAR*x*TM*∨
*Theorema‘Knowledge‘Q*TM[Theorema‘Language‘VAR[*Theorema‘Knowledge‘VAR*x*TM*]]∧
∀RNG (SIMPRNG (*Theorema‘Knowledge‘VAR* y*TM*, *Theorema‘Language‘Implies*TM[Theorema‘Knowledg
Theorema‘Knowledge‘Q*TM*[*Theorema‘Language‘VAR*[Theorema‘Knowledge‘VAR*y*TM]]]
↔ ∀RNG (SIMPRNG (*Theorema‘Knowledge‘VAR* x*TM*, *Theorema‘Knowledge‘Q*TM[Theorema‘Language‘V

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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 [?]

$\forall$*Theorema*‘*Language*‘*RNG*[Theorema‘Language‘SIMPRNG[*Theorema*‘*Language*‘*VAR*[Theorema‘Knowle
Theorema‘Language‘SIMPRNG[*Theorema*‘*Language*‘*VAR*[Theorema‘Knowledge‘VAR*b*TM]]],
Theorema‘Language‘IffDef*TM*[*Theorema*‘*Language*‘*Annotated*TM[Theorema‘Language‘Less*TM*, *Theorem*
Theorema‘Language‘VAR[*Theorema*‘*Knowledge*‘*VAR*b*TM*]], *Theorema*‘*Language*‘*Exists*TM[Theorema‘L
Theorema‘Language‘Subscript*TM*[*Theorema*‘*Language*‘*VAR*[Theorema‘Knowledge‘VAR*b*TM],
Theorema‘Language‘VAR[*Theorema*‘*Knowledge*‘*VAR*i*TM*]]], *Theorema*‘*Language*‘*Forall*TM[Theorema‘L
Theorema‘Language‘VAR[*Theorema*‘*Knowledge*‘*VAR*j*TM*]], *Theorema*‘*Language*‘*Subscript*TM[Theorema

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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 [?]

∀$Theorema‘Language‘RNG$[Theorema‘Language‘SIMPRNG[$Theorema‘Language‘VAR$[Theorema‘Knowle
Theorema‘Language‘SIMPRNG[$Theorema‘Language‘VAR$[Theorema‘Knowledge‘VARyTM]]],
Theorema‘Language‘EqualDefTM[$Theorema‘Language‘SubsetEqual$TM[Theorema‘Language‘VAR[$Theore$
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 $\subseteq$)

$\forall$*Theorema*‘*Language*‘*RNG*[Theorema‘Language‘SIMPRNG[*Theorema*‘*Language*‘*VAR*[Theorema‘Knowle
Theorema‘Language‘SIMPRNG[*Theorema*‘*Language*‘*VAR*[Theorema‘Knowledge‘VAR*b*TM]],
Theorema‘Language‘SIMPRNG[*Theorema*‘*Language*‘*VAR*[Theorema‘Knowledge‘VAR*c*TM]]],
Theorema‘Language‘Implies*TM*[*Theorema*‘*Language*‘*And*TM[Theorema‘Language‘SubsetEqual*TM*[*Theor*
Theorema‘Language‘VAR[*Theorema*‘*Knowledge*‘*VAR*b*TM*]], *Theorema*‘*Language*‘*SubsetEqual*TM[Theor
Theorema‘Language‘SubsetEqual*TM*[*Theorema*‘*Language*‘*VAR*[Theorema‘Knowledge‘VAR*a*TM],
Theorema‘Language‘VAR[*Theorema*‘*Knowledge*‘*VAR*c*TM*]]]

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