Theorema 2.0: A First Tour

NB reached List of cells reached CellGroupData reached List of cells reached NullCell 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)

$$\forall_{(x)} P(x) \vee Q(x) \wedge \forall_{(y)} P(y) \implies Q(y) \leftrightarrow \forall_{(x)} Q(x)$$

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2 Computing

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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`Knowledge`V
Theorema`Language`SIMPRNG[$Theorema`Language`VAR$[Theorema`Knowledge`VARbTM]]]
Theorema`Language`IffDefTM[$Theorema`Language`Annotated$TM[Theorema`Language`LessTM, $Theorem$
Theorema`Language`VAR[$Theorema`Knowledge`VAR$bTM]], $Theorema`Language`Exists$TM[Theorema`L
Theorema`Language`SubscriptTM[$Theorema`Language`VAR$[Theorema`Knowledge`VARbTM],
Theorema`Language`VAR[$Theorema`Knowledge`VAR$iTM]]], $Theorema`Language`Forall$TM[Theorema`L
Theorema`Language`VAR[$Theorema`Knowledge`VAR$jTM]], $Theorema`Language`Subscript$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`m1TM
Theorema`Language`SubscriptTM[$Theorema`Language`Subscript$TM[Theorema`Knowledge`m2TM, 2], The

2.3 [?]

Theorema‘Language‘IffDefTM[$Theorema$‘$Language$‘$DomainOperation$TM[Theorema‘Knowledge‘MTM, T
Theorema‘Language‘AnnotatedTM[$Theorema$‘$Language$‘$Less$TM,
Theorema‘Language‘SubScriptTM[$Theorema$‘$Knowledge$‘lexTM]][Theorema‘Language‘SubscriptTM[$Theo$
2], Theorema‘Language‘SubscriptTM[$Theorema$‘$Knowledge$‘m2TM, 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 [?]

$\forall_{Theorema‘Language‘RNG}$[Theorema‘Language‘SIMPRNG[$Theorema$‘$Language$‘VAR[Theorema‘Knowledge‘V
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[$Theorema$‘$Knowledge$‘VARy$TM]]]]]

■Cell reached

3.2 Proposition (transitivity of $\subseteq$)

$\forall_{Theorema‘Language‘RNG}$[Theorema‘Language‘SIMPRNG[$Theorema$‘$Language$‘VAR[Theorema‘Knowledge‘V
Theorema‘Language‘SIMPRNG[$Theorema$‘$Language$‘VAR[Theorema‘Knowledge‘VARbTM]],
Theorema‘Language‘SIMPRNG[$Theorema$‘$Language$‘VAR[Theorema‘Knowledge‘VARcTM]]]
Theorema‘Language‘SubsetEqualTM[$Theorema$‘$Language$‘VAR[Theorema‘Knowledge‘VARaTM],
Theorema‘Language‘VAR[$Theorema$‘$Knowledge$‘VARbTM]] $\wedge$
$Theorema$‘$Language$‘$SubsetEqual$TM[Theorema‘Language‘VAR[$Theorema$‘$Knowledge$‘VARbTM], $Theor$
$\Longrightarrow$ $Theorema$‘$Language$‘$SubsetEqual$TM[Theorema‘Language‘VAR[$Theorema$‘$Knowledge$‘VARaTM], T

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