Theorema 2.0: A First Tour

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

1   Proving

We want to prove

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

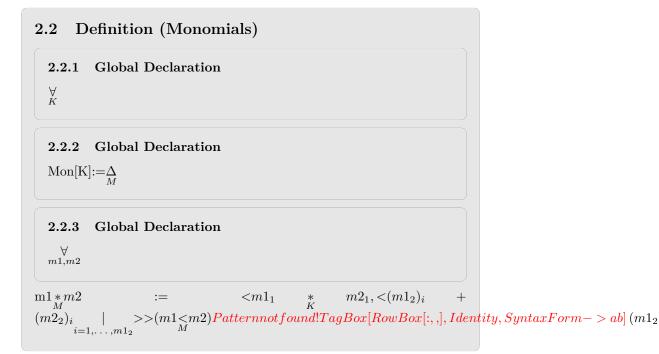To prove a formula like the above, we need to enter it in the context of a Theorema environment.

> ## 1.1   Proposition (First Test, 2014)
>
> $$\left(\left(\underset{x}{\forall}(P[x] \lor Q[x])\right) \land \left(\underset{y}{\forall}(P[y] \Rightarrow Q[y])\right)\right) \Leftrightarrow \left(\underset{x}{\forall}Q[x]\right) \blacksquare$$

2 Computing

2.1 Definition (Lexical Ordering)

2.1.1 Global Declaration

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

$$a <_{lex} b \rightarrow \left(\underset{i=1,\ldots,a}{\exists} \left(a_i < b_i \wedge \left(\underset{j=1,\ldots,i-1}{\forall} (a_j = b_j) \right) \right) \right) \blacksquare$$

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

2.2 Definition (Monomials)

2.2.1 Global Declaration

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

2.2.2 Global Declaration

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

2.2.3 Global Declaration

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

$$\underset{M}{m1 * m2} \quad := \quad < m1_1 \quad \underset{K}{*} \quad m2_1, < (m1_2)_i \quad + \\ (m2_2)_i \underset{i=1,\ldots,m1_2}{\big|} >> (m1 \underset{M}{<} m2) \textcolor{red}{Pattern\,not\,found! TagBox[RowBox[:,,], Identity, SyntaxForm-> ab]} (m1_2$$

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3   Set Theory

3.1   Definition (subset)

3.1.1   Global Declaration

$$\forall_{x,y}$$

$$\mathrm{xy} := \left(\forall_{z} \left(zx \Rightarrow zy \right) \right) \blacksquare$$

Cell reached

3.2   Proposition (transitivity of)

$$\forall_{a,b,c} \left(\left(ab \wedge bc \right) \Rightarrow ac \right) \blacksquare$$

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