Axioms, Definitions and Rules of Propositional Calculus

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Abstract

This module includes the axioms of propositional calculus due to Lukasiewicz and Tarski. These axioms, together with some definitions and rules of derivations, allow the deduction of all valid formulas of propositional logic.

The primitive logical symbols are implication ('→') and negation ('¬'). The other operands will be defined by them.

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Specification

This document has the following specification:

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Content

Axiom 0.1 (axiom1).
$$P \rightarrow (Q \rightarrow P)$$

Axiom 0.2 (axiom2).
$$(P \rightarrow (Q \rightarrow A)) \rightarrow ((P \rightarrow Q) \rightarrow (P \rightarrow A))$$

Axiom 0.3 (axiom3).
$$(\neg Q \rightarrow \neg P) \rightarrow (P \rightarrow Q)$$

Abbreviation 0.1 (or).
$$@F_1 \ \lor \ @F_2 \equiv \neg@F_1 \ \rightarrow \ @F_2$$

This means that we could transform a part formula that matches the pattern on the left side into the right side and we could transform a part formula that matches the pattern on the right side into the formula on the left side.

Abbreviation 0.2 (and).
$$@F_1 \ \land \ @F_2 \equiv \neg(\neg@F_1 \ \lor \ \neg@F_2)$$

Abbreviation 0.3 (equi).
$$@F_1 \ \leftrightarrow \ @F_2 \equiv (@F_1 \ \rightarrow \ @F_2) \ \land \ (@F_2 \ \rightarrow \ @F_1)$$

Rule Declaration 0.1 (rule1). *modus ponens*

For an explanation see Modus Ponens or Modus Ponens (o)

Rule Declaration 0.2 (rule2). *add axiom*

For an explanation see Add Axiom or Add Axiom (o)

Rule Declaration 0.3 (rule3). *add sentence*

For an explanation see Add Proposition or Add Proposition (o)

Rule Declaration 0.4 (rule4). *replace proposition variable*

For an explanation see Replace Proposition Variable or Replace Proposition Variable (o)

Rule Declaration 0.5 (rule5). *use abbreviation*

For an explanation see Use Abbreviation or Use Abbreviation (o)

Rule Declaration 0.6 (rule6). *reverse abbreviation*

For an explanation see Reverse Abbreviation or Reverse Abbreviation (o)

1   Cross Reference

This module is used by the following modules:

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Version:	1.00.00
Rule version:	1.00.00
Orgin:	luktheo1_1.00.00_1.00.00.qedeq
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