Contents

Part I

Logic

Chapter 1

Introduction

some stuff on propositional logic, induction, well-formed formula. – need to be completed. For all proposition A we can define the set of all its sub-proposition, $\mathrm{SP}A$, and it can be defined inductively. Order of operation. A meaning is a function $I : \mathrm{PR} \to \{0, 1\}$ such that;

1. $I(\bot) = 0$.
2. $I(A \wedge B) = I(A)I(B)$.
3. $I(\neg A) = 1 - I(A)$. (a book on negation)
4. $I(A \vee B) = \max\{I(A), I(B)\}$.
5. $I(A \to B) = I(\neg A \vee B)$. A point of contention among logician.

An evaluation is a meaning function restricted to the atomes, $\nu : P \to \{0, 1\}$.

Theorem 1.1. *For each evaluation function there is unique extension to a meaning function.*

$I \models A$ if $I(A) = 1$. $\models A$ means $I \models A$ for all I, a tautology. $\not\models A$ if $I(A) = 0$ for all I. If Γ is a subset of proposition then, $\Gamma \models A$ when for all $I \models \Gamma$ then $I \models A$.

some propositions regarding meaning and evaluation.

$A[P|b]$ substituition theorem.

1.1 Inference rules

– Hilbert's method

1.1.1 Natural Deduction

Everything is a rule. Two types of rules, introduction rules and elimination rules.