Mathematical Logics
Set Theory*

Fausto Giunchiglia and Mattia Fumagallli

University of Trento

*Originally by Luciano Serafini and Chiara Ghidini
Modified by Fausto Giunchiglia and Mattia Fumagalli

Outline

1. Introduction and motivation
2. Basic notions
3. Relations
4. Functions
5. Exercises

Extensional Semantics: Extensions

- The meanings which are intended to be attached to the symbols and propositions form the intended interpretation of the language
- We consider only extensional (semantics)
- The extensional semantics of L is based on the notion of "extension" of a formula (proposition) in L
- The extension of a proposition is the totality, or class, or set of all objects D (domain elements) to which the proposition applies

Domain in set theory – example 1

Language L

- Alphabet = {A, B, $\wedge$, $\vee$}
- Syntactic constructors:
  - If A, B formulas in L then A $\wedge$ B is also a formula in L
  - If A, B formulas of L then A $\vee$ B is also a formula in L

- Domain D
  - D = {T, F}

- Interpretation I: I: L $\rightarrow$ D

Domain in set theory – example 2

Language L

- Alphabet = {A, B, $\wedge$, $\vee$}
- Syntactic constructors:
  - If A, B formulas in L then A $\wedge$ B is also a formula in L
  - If A, B formulas of L then A $\vee$ B is also a formula in L

- Domain D – In our course always set theory
  - D = {Fausto, Maria, John, …, 1,2,10, …}

- Interpretation I: I: L $\rightarrow$ D

Mathematical Logics
Set Theory*

Fausto Giunchiglia and Mattia Fumagallli

University of Trento

*Originally by Luciano Serafini and Chiara Ghidini
Modified by Fausto Giunchiglia and Mattia Fumagalli