



UNIVERSITEIT VAN AMSTERDAM  
INSTITUTE FOR LOGIC, LANGUAGE AND COMPUTATION

# Axiomatic Set Theory

(Axiomatische Verzamelingsentheorie)

2003/2004; 2nd Trimester  
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## Homework Set # 2

Deadline: Thursday, January 22nd, 2004

### Exercise 2.1 (Different Sets)

Work in the theory (I) + (II). Prove that the sets

$$\emptyset, \{\emptyset\}, \{\{\emptyset\}\}, \{\emptyset, \{\emptyset\}\}$$

are pairwise different, *i.e.*, that

- $\emptyset \neq \{\emptyset\}$ ,
- $\emptyset \neq \{\{\emptyset\}\}$ ,
- $\emptyset \neq \{\emptyset, \{\emptyset\}\}$ ,
- $\{\emptyset\} \neq \{\{\emptyset\}\}$ ,
- $\{\emptyset\} \neq \{\emptyset, \{\emptyset\}\}$ , and
- $\{\{\emptyset\}\} \neq \{\emptyset, \{\emptyset\}\}$ .

### Exercise 2.2 (Commutativity)

Work in the theory (I) + (II) + (III). Prove that for all sets  $x$  and  $y$ ,

- $\{x, y\} = \{y, x\}$ , and
- $x \cap y = y \cap x$ .