TECHNISCHE UNIVERSITÄT DRESDEN

DRESDEN concept

Lucas Waclawczyk

Decidability of Logical Theories

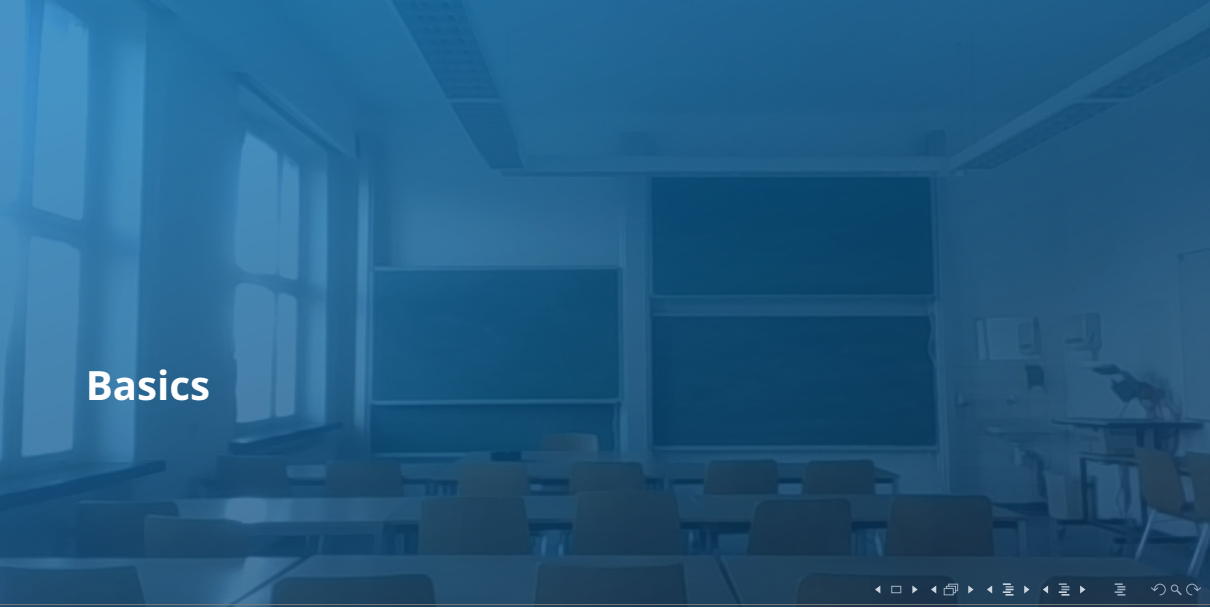
Proseminar Theoretical Computer Science // Dresden, 28. April 2020

Inhalt

Basics
- Automata
- Turing Machines
- First-Order Logic

Th($\mathbb{N}, +$) – A Decidable Theory

Th($\mathbb{N}, +, \times$) – An Undecidable Theory



Basics

Automata

Turing Machines

First-Order Logic

Th($\mathbb{N}, +$) – A Decidable Theory

Theorem 1

Th($\mathbb{N}, +$) is decidable

Theorem 1

Th($\mathbb{N}, +$) is decidable

i.e., there is an algorithm that can decide, whether a sentence $\varphi \in$ L($\mathbb{N}, +$) is true or false.

Th($\mathbb{N}, +, \times$) – An Undecidable Theory

Theorem 1

Th($\mathbb{N}, +, \times$) is undecidable

Theorem 1

Th($\mathbb{N}, +, \times$) is undecidable

i.e., there is no algorithm that can decide, whether a sentence $\varphi \in$ L($\mathbb{N}, +$) is true or false.