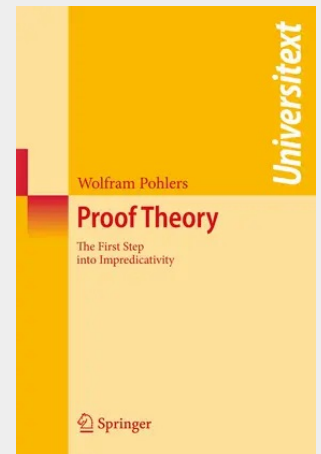


Proof Theory

The First Step into Impredicativity

The kernel of this book consists of a series of lectures on ω -nitary proof theory which I gave during my time at the Westfälische "Wilhelms-Universität" in Münster. It was planned as a successor of Springer Lecture Notes in Mathematics 1407. However, when preparing it, I decided to also include material which has not been treated in SLN 1407. Since the appearance of SLN 1407 many innovations in the area of ordinal analysis have taken place. Just to mention those of them which are addressed in this book: Buchholz simplified local predicativity by the invention of operator controlled derivations (cf. Chapter 9, Chapter 11); Weiermann detected applications of methods of impredicative proof theory to the characterization of the provable recursive functions of predicative theories (cf. Chapter 10); Beckmann improved Gentzen's boundedness theorem (which appears as Stage Theorem (Theorem 6.6.1) in this book) to Theorem 6.6.9, a theorem which is very satisfying in itself - though its real importance lies in the ordinal analysis of systems, weaker than those treated here. Besides these innovations I also decided to include the analysis of the theory $(\omega\text{-REF})$ as an example of a subtheory of set theory whose ordinal analysis only ω requires a first step into impredicativity. The ordinal analysis of $(\omega\text{-FXP})$ of non- ω monotone ω -definable inductive definitions in Chapter 13 is an application of the ω analysis of $(\omega\text{-REF})$.

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