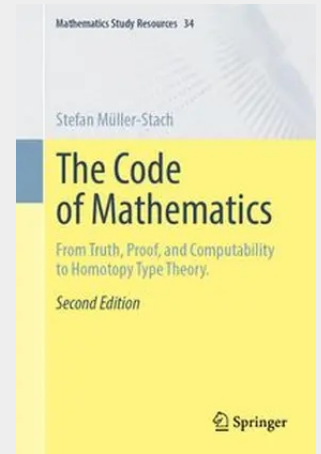


The Code of Mathematics

From Truth, Proof, and Computability to Homotopy Type Theory.

Inspired by recent developments in dependent type theory and infinity categories, this book presents a history of ideas around the topics of truth, proof, equality and equivalence. Besides selected ideas of Platon, Aristoteles, Leibniz, Kant, Frege and others, the results of Gödel and Tarski on incompleteness, undecidability and truth in deductive systems and their semantic models are covered. The main focus of this textbook is on dependent type theory and its recent variant homotopy type theory. Such theories contain identity types, which give a new understanding of equality, symmetry, equivalence and isomorphism in a conceptual way. The interaction of type theory and infinity category theory yields a new paradigm for a structural view on mathematics. This supports the tendencies towards formalising mathematics with the help of proof assistants. The first edition of this book was first published in German. The translation was done with the help of artificial intelligence. A subsequent human revision was done primarily in terms of content. This second edition has been completely revised and expanded to include a more detailed introduction to Homotopy Type Theory.

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