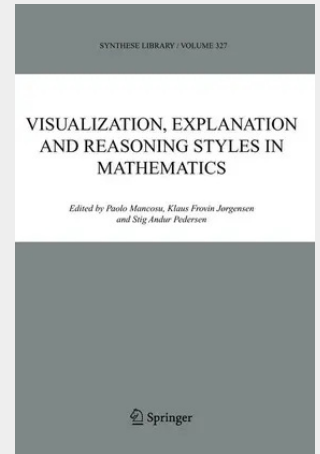


Visualization, Explanation and Reasoning Styles in Mathematics

In the 20th century philosophy of mathematics has to a great extent been dominated by views developed during the so-called foundational crisis in the beginning of that century. These views have primarily focused on questions pertaining to the logical structure of mathematics and questions regarding the justification and consistency of mathematics. Paradigmatic in this respect is Hilbert's program which inherits from Frege and Russell the project to formalize all areas of ordinary mathematics and then adds the requirement of a proof, by epistemically privileged means (intuitionistic reasoning), of the consistency of such formalized theories. While interest in modified versions of the original foundational programs is still thriving, in the second part of the twentieth century several philosophers and historians of mathematics have questioned whether such foundational programs could exhaust the realm of important philosophical problems to be raised about the nature of mathematics. Some have done so in open confrontation (and hostility) to the logically based analysis of mathematics which characterized the classical foundational programs, while others (and many of the contributors to this book belong to this tradition) have only called for an extension of the range of questions and problems that should be raised in connection with an understanding of mathematics. The focus has turned thus to a consideration of what mathematicians are actually doing when they produce mathematics. Questions concerning concept-formation, understanding, heuristics, changes in style of reasoning, the role of analogies and diagrams etc.

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106,99 €
99,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9781402033346
Medium: Buch
ISBN: 978-1-4020-3334-6
Verlag: Springer
Erscheinungstermin: 20.04.2005
Sprache(n): Englisch
Auflage: Erscheinungsjahr 2005
Serie: Synthese Library
Produktform: Gebunden
Gewicht: 1370 g
Seiten: 300
Format (B x H): 160 x 241 mm

