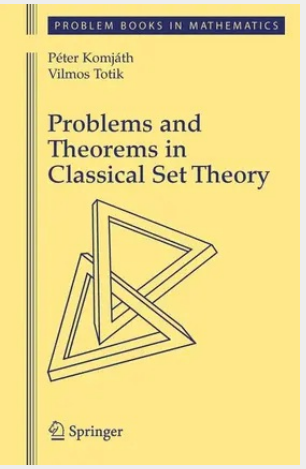
Komjath / Totik

Problems and Theorems in Classical Set Theory



Although the ?rst decades of the 20th century saw some strong debates on set theory and the foundation of mathematics, afterwards set theory has turned into a solid branch of mathematics, indeed, so solid, that it serves as the foundation of the whole building of mathematics. Later generations, honest to Hilbert's dictum, "No one can chase us out of the paradise that Cantor has created for us" proved countless deep and interesting theorems and also applied the methods of set theory to various problems in algebra, topology, in?nitary combinatorics, and real analysis. The invention of forcing produced a powerful, technically sophisticated tool for solving unsolvable problems. Still, most results of the pre-Cohen era can be digested with just the knowledge of a commonsense introduction to the topic. And it is a worthy e?ort, here we refer not just to usefulness, but, ?rst and foremost, to mathematical beauty. In this volume we o?er a collection of various problems in set theory. Most of classical set theory is covered, classical in the sense that independence methods are not used, but classical also in the sense that most results come fromtheperiod,say,1920–1970.Manyproblemsarealsorelatedtoother?elds of mathematics such as algebra, combinatorics, topology, and real analysis. We do not concentrate on the axiomatic framework, although some - pects, such as the axiom of foundation or the role ˆ of the axiom of choice, are elaborated.

This is the first comprehensive collection of problems in set theory. But rather than using drill exercises, most problems are challenging and require work, wit, and inspiration. They vary in difficulty, and are organized in such a way that earlier problems help in the solution of later ones. For many of the problems, the authors also trace the history of the problems and then provide proper reference at the end of the solution. This is destined to become a classic, and will be an important resource for students and researchers. It follows a tradition of Hungarian mathematics started with Pólya-Szegõ's problem book in analysis and continued with Lovász' problem book in combinatorics.

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