

Enumerative Combinatorics

This book offers a systematic and accessible introduction to enumerative combinatorics, the branch of mathematics concerned with counting discrete structures. Each topic is developed from first principles and supported by carefully chosen examples and exercises.

The first part establishes the foundations of combinatorial reasoning. It introduces the basic counting principles and their applications to classical sequences such as binomial coefficients, Stirling numbers, and Bell numbers, and provides entry points to discrete probability and graph theory, both as tools and as sources of enumerative problems. The second part presents the central methods of modern enumeration. Recurrence relations and generating functions are developed as primary techniques, with applications to integer partitions, permutations, and related structures. The final chapter turns to unlabelled structures, introducing group actions as a framework for understanding symmetry in counting.

Aimed at advanced undergraduate and beginning graduate courses, the clear exposition and numerous exercises make the book suitable for self-study.

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