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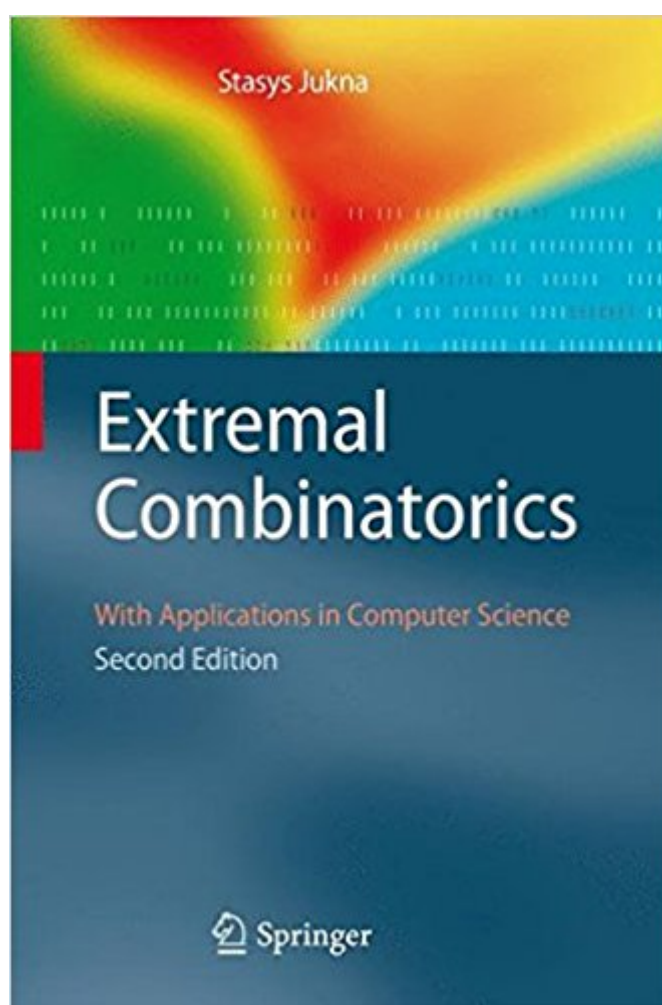
Extremal Combinatorics: With Applications In Computer Science (Texts In Theoretical Computer Science. An EATCS Series)

Stasys Jukna

Extremal Combinatorics

With Applications in Computer Science

Second Edition

Springer

Synopsis

This book is a concise, self-contained, up-to-date introduction to extremal combinatorics for nonspecialists. There is a strong emphasis on theorems with particularly elegant and informative proofs, they may be called gems of the theory. The author presents a wide spectrum of the most powerful combinatorial tools together with impressive applications in computer science: methods of extremal set theory, the linear algebra method, the probabilistic method, and fragments of Ramsey theory. No special knowledge in combinatorics or computer science is assumed Ã¢â ¬â œ the text is self-contained and the proofs can be enjoyed by undergraduate students in mathematics and computer science. Over 300 exercises of varying difficulty, and hints to their solution, complete the text.This second edition has been extended with substantial new material, and has been revised and updated throughout. It offers three new chapters on expander graphs and eigenvalues, the polynomial method and error-correcting codes. Most of the remaining chapters also include new material, such as the KruskalÃ¢â ¬â ¢Katona theorem on shadows, the LovÃƒÂ¡szÃ¢â ¬â ¢Stein theorem on coverings, large cliques in dense graphs without induced 4-cycles, a new lower bounds argument for monotone formulas, Dvir's solution of the finite field Kakeya conjecture, Moser's algorithmic version of the LovÃƒÂ¡sz Local Lemma, SchÃƒÂ¶ning's algorithm for 3-SAT, the SzemerÃƒÂ©diÃ¢â ¬â ¢Trotter theorem on the number of point-line incidences, surprising applications of expander graphs in extremal number theory, and some other new results.

Book Information

Customer Reviews

From the reviews of the second edition:Ã¢â ¬Å"This is an entertaining and impressive book. I say impressive because the author managed to cover a very large part of combinatorics in 27 short chapters, without assuming any graduate-level knowledge of the material. Ã¢â ¬Â| The collection of topics covered is another big advantage of the book. Ã¢â ¬Â| The book is ideal as reference material or for a reading course for a dedicated graduate student. One could teach a very enjoyable class from it as well Ã¢â ¬Â| .Ã¢â ¬Â• (MiklÃƒÂ s BÃƒÂ na, The Mathematical Association of America, May, 2012)"[R]eaders interested in any branch of combinatorics will find this book compelling. ... This book is very suitable for advanced undergraduate and graduate mathematics and computer science majors. It requires a very solid grounding in intermediate-level combinatorics and an appreciation for several proof methods, but it is well worth the study." (G.M. White, ACM Computing Reviews, May 2012)Ã¢â ¬Å"This is the second edition of a well-received textbook. It has been extended with new and updated results. Typographical errors in the first edition are corrected. Ã¢â ¬Â| This textbook is suitable for advanced undergraduate or graduate students as well as researchers working in discrete mathematics or theoretical computer science. The authorÃ¢â ¬â„¢s enthusiasm for the subject is evident and his writing is clear and smooth. This is a book deserving recommendation.Ã¢â ¬Â• (Ko-Wei Lih, Zentralblatt MATH, Vol. 1239, 2012)Ã¢â ¬Å"This is an introductory book that deals with the subject of extremal combinatorics. Ã¢â ¬Â| The book is nicely written and the author has included many elegant and beautiful proofs. The book contains many interesting exercises that will stimulate the motivated reader to get a better understanding of this area. Ã¢â ¬Â| authorÃ¢â ¬â„¢s goal of writing a self-contained book that is more or less up to date Ã¢â ¬Â| and that is accessible to graduate and motivated undergraduate students in mathematics and computer science, has been successfully achieved.Ã¢â ¬Â• (Sebastian M. CioabÃƒÂ„Æ', Mathematical Reviews, January, 2013)

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A collection of gems from the field of extremal combinatorics, written in the informal but thorough style of George Polya. I very much enjoy browsing this book, especially at night, when I 'm looking for a digestible morsel to chew on before falling asleep. Like Polya, his writing style is both upbeat, lean and enthusiastic. The author doesn't dwell too much on any single problem and covers a lot ground for a single book, using concrete problems to illustrate a particular subject. The book reads as if the author is speaking directly to you.I am professional programmer with a math background who very much recommends this book to a programmer looking to get a feel for the subject of combinatorics from a more than introductory point of view. I would have given 5 stars, but the editing is sloppy. Also, don't expect to start cutting code tomorrow. The book is much more a math book than computer science book.

The author covers exactly what the title promises: How to calculate bounds for combinatorial objects. To this end various methods are introduced and carefully explained.The proofs are generally not too difficult - and many would qualify for ErdÃƒÂ¶s' famous "God's book of perfect proofs"!While the formal mathematical prerequisites are rather minimal, I feel the book requires some maturity in math. (However, I am just a hobby mathematician, so do not take this too seriously!)The author, no question!, seems a master of his subject: The style or writing is "lean", every word counts, but one does never feel like anything is missing.For anybody interested in "beautiful mathematics" this is certainly a book to read!There a not too many typos in the book, and most of them are easily recognized, they do not distract at all.The book contains many excercises (with exhaustive hints), but I did not do them, so I cannot comment.

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