



Grobner Bases and Convex Polytopes (University Lecture Series, No. 8)

By *Bernd Sturmfels*

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This book is about the interplay of computational commutative algebra and the theory of convex polytopes. It centers around a special class of ideals in a polynomial ring: the class of toric ideals. They are characterized as those prime ideals that are generated by monomial differences or as the defining ideals of toric varieties (not necessarily normal). The interdisciplinary nature of the study of Gröbner bases is reflected by the specific applications appearing in this book. These applications lie in the domains of integer programming and computational statistics. The mathematical tools presented in the volume are drawn from commutative algebra, combinatorics, and polyhedral geometry.

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Review

"This book is a state-of-the-art account of the rich interplay between combinatorics and geometry of convex polytopes and computational commutative algebra via the tool of Gröbner bases. It is an essential introduction for those who wish to perform research in this fast-developing, interdisciplinary field. For the math programmer, this book could be viewed as an exposition of the interactions between integer programming and Gröbner bases." ---- Optima

"Material is presented in a concise way ... lots of motivating examples ... not only of interest for mathematicians studying Gröbner bases, but also for researchers working on the mathematical aspects of integer programming and computational statistics." ---- Newsletter on Computational and Applied Mathematics

"Thanks to the author's ingenious writing, most of the material should be accessible to first-year graduate students in mathematics ... will be a landmark for further study of Gröbner bases in new branches of mathematics. It underlines the powerful techniques of commutative algebra in the interplay with combinatorics and polyhedral geometry." -- Mathematical Reviews ---- Mathematical Reviews

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