**IDEALS, VARIETIES, AND ALGORITHMS**

An Introduction to Computational Algebraic Geometry and Commutative Algebra

**Third Edition**

David Cox   John Little   Donal O'Shea

**Springer**

3rd ed. 2007, XV, 553 p.

### eBook

36,99 € | £31.99 | $44.99
[2]36,99 € (D) | 36,99 € (A) | CHF 57,00

Available from your library or springer.com/shop

### MyCopy [3]

Printed eBook for just
€ | $ 24.99
springer.com/mycopy

David A. Cox, John Little, DONAL OSHEA

# Ideals, Varieties, and Algorithms

## An Introduction to Computational Algebraic Geometry and Commutative Algebra

### Series: Undergraduate Texts in Mathematics

- Covers important topics such as the Hilbert Basis Theorem, the Nullstellensatz, invariant theory, projective geometry, and dimension theory
- Includes a significantly updated section on Maple in Appendix C
- Contains updated information on AXIOM, CoCoA, Macaulay 2, Magma, Mathematica and SINGULAR
- A shorter proof of the Extension Theorem is presented in Section 6 of Chapter 3
- Over 200 pages reflect changes as compared to the 2nd edition to enhance clarity and correctness

Algebraic Geometry is the study of systems of polynomial equations in one or more variables, asking such questions as: Does the system have finitely many solutions, and if so how can one find them? And if there are infinitely many solutions, how can they be described and manipulated? The solutions of a system of polynomial equations form a geometric object called a variety; the corresponding algebraic object is an ideal. There is a close relationship between ideals and varieties which reveals the intimate link between algebra and geometry. Written at a level appropriate to undergraduates, this book covers such topics as the Hilbert Basis Theorem, the Nullstellensatz, invariant theory, projective geometry, and dimension theory. The algorithms to answer questions such as those posed above are an important part of algebraic geometry. Although the algorithmic roots of algebraic geometry are old, it is only in the last forty years that computational methods have regained their earlier prominence. New algorithms, coupled with the power of fast computers, have led to both theoretical advances and interesting applications, for example in robotics and in geometric theorem proving. In addition to enhancing the text of the second edition, with over 200 pages reflecting changes to enhance clarity and correctness, this third edition of Ideals, Varieties and Algorithms includes: A significantly updated section on Maple in Appendix C; Updated information on AXIOM, CoCoA, Macaulay 2, Magma, Mathematica and SINGULAR; A shorter proof of the Extension Theorem presented in Section 6 of Chapter 3. From the 2nd edition: "I consider the book to be wonderful. ...

Part of **SPRINGER NATURE**