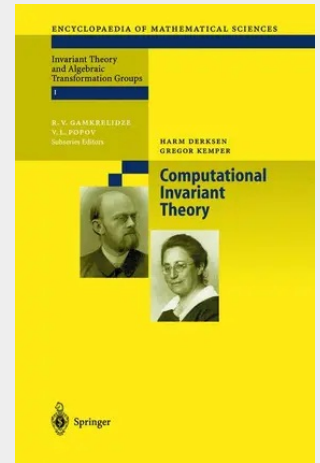


Computational Invariant Theory

This book, the first volume of a subseries on "Invariant Theory and Algebraic Transformation Groups", provides a comprehensive and up-to-date overview of the algorithmic aspects of invariant theory. Numerous illustrative examples and a careful selection of proofs make the book accessible to non-specialists.

Invariant theory is a subject with a long tradition and an astounding ability to rejuvenate itself whenever it reappears on the mathematical stage. Throughout the history of invariant theory, two features of it have always been at the center of attention: computation and applications. This book is about the computational aspects of invariant theory. We present algorithms for calculating the invariant ring of a group that is linearly reductive or finite, including the modular case. These algorithms form the central pillars around which the book is built. To prepare the ground for the algorithms, we present Gröbner basis methods and some general theory of invariants. Moreover, the algorithms and their behavior depend heavily on structural properties of the invariant ring to be computed. Large parts of the book are devoted to studying such properties. Finally, most of the applications of invariant theory depend on the ability to calculate invariant rings. The last chapter of this book provides a sample of applications inside and outside of mathematics.



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