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Autore	Colarte-Gómez Liena
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Altri autori (Persone)	Miró-RoigRosa Maria
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Sommario/riassunto	This book presents progress on two open problems within the framework of algebraic geometry and commutative algebra: Gröbner's problem regarding the arithmetic Cohen-Macaulayness (aCM) of projections of Veronese varieties, and the problem of determining the structure of the algebra of invariants of finite groups. We endeavour to understand their unexpected connection with the weak Lefschetz properties (WLPs) of artinian ideals. In 1967, Gröbner showed that the Veronese variety is aCM and exhibited examples of aCM and nonaCM monomial projections. Motivated by this fact, he posed the problem of determining whether a monomial projection is aCM. In this book, we provide a comprehensive state of the art of Gröbner’s problem and we contribute to this question with families of monomial projections parameterized by invariants of a finite abelian group called G-varieties. We present a new point of view in the study of Gröbner’s problem, relating it to the WLP of Artinian ideals. GT varieties are a subclass of G varieties parameterized by invariants generating an Artinian ideal failing the WLP, called the Galois-Togliatti system. We studied the

geometry of the G-varieties; we compute their Hilbert functions, a minimal set of generators of their homogeneous ideals, and the canonical module of their homogeneous coordinate rings to describe their minimal free resolutions. We also investigate the invariance of nonabelian finite groups to stress the link between projections of Veronese surfaces, the invariant theory of finite groups and the WLP. Finally, we introduce a family of smooth rational monomial projections related to G-varieties called RL-varieties. We study the geometry of this family of nonaCM monomial projections and we compute the dimension of the cohomology of the normal bundle of RL varieties. This book is intended to introduce Gröbner's problem to young researchers and provide new points of view and directions for further investigations.