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Nota di contenuto	<p>Preface; Contents; 0. Introduction; 1. Preliminaries; 1.1 Presenting Algebras by Relations; 1.2 S-Graded Algebras and Modules; 1.3 -Filtered Algebras and Modules; 2. The -Leading Homogeneous Algebra A LH; 2.1 Recognizing A via G (A): Part 1; 2.2 Recognizing A via G (A): Part 2; 2.3 The -Graded Isomorphism A LH G (A); 2.4 Recognizing A via A LH; 3. Grobner Bases: Conception and Construction; 3.1 Monomial Ordering and Admissible System; 3.2 Division Algorithm and Grobner Basis; 3.3 Grobner Bases and Normal Elements; 3.4 Grobner Bases w.r.t. Skew Multiplicative K-Bases</p> <p>3.5 Grobner Bases in <math>K[X_1, \dots, X_n]</math> and <math>KQ</math>; 3.6 (De)homogenized Grobner Bases; 3.7 dh-Closed Homogeneous Grobner Bases; 4. Grobner Basis Theory Meets PBW Theory; 4.1 -Standard Basis and -PBW Isomorphism; 4.2 Realizing -PBW Isomorphism by Grobner Basis; 4.3 Classical PBW K-Bases vs Grobner Bases; 4.4 Solvable Polynomial Algebras Revisited; 5. Using AB LH in Terms of Grobner Bases; 5.1 The Working Strategy; 5.2 Ufnarovski Graph; 5.3 Determination of Gelfand-Kirillov Dimension; 5.4 Recognizing Noetherianity; 5.5 Recognizing (Semi-)Primeness and PI-Property</p> <p>5.6 Anick's Resolution over Monomial Algebras; 5.7 Recognizing Finiteness of Global Dimension; 5.8 Determination of Hilbert Series; 6. Recognizing (Non-)Homogeneous p-Koszulity via ABLH; 6.1 (Non-)Homogeneous p-Koszul Algebras; 6.2 Anick's Resolution and Homogeneous p-Koszulity; 6.3 Working in Terms of Grobner Bases; 7. A Study of Rees Algebra by Grobner Bases; 7.1 Defining A by <math>G^*</math>; 7.2</p>

Defining  $A$  by  $G$ ; 7.3 Recognizing Structural Properties of  $A$  via  $G$ ; 7.4 An Application to Regular Central Extensions; 7.5 Algebras Defined by  $\delta$ -Closed Homogeneous Grobner Bases; 8. Looking for More Grobner Bases  
8.1 Lifting (Finite) Grobner Bases from  $\text{On}(j)$  8.2 Lifting (Finite) Grobner Bases from a Class of Algebras; 8.3 New Examples of Grobner Basis Theory; 8.4 Skew 2-Nomial Algebras; 8.5 Almost Skew 2-Nomial Algebras; Bibliography; Index

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## Sommario/riassunto

This monograph strives to introduce a solid foundation on the usage of Grobner bases in ring theory by focusing on noncommutative associative algebras defined by relations over a field  $K$ . It also reveals the intrinsic structural properties of Grobner bases, presents a constructive PBW theory in a quite extensive context and, along the routes built via the PBW theory, the book demonstrates novel methods of using Grobner bases in determining and recognizing many more structural properties of algebras, such as the Gelfand-Kirillov dimension, Noetherianity, (semi-)primeness, PI-property, finiteness

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