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Nota di contenuto	0. Introduction -- 1. Scalar Linear Systems over the Complex Numbers -- 2. Scalar Linear Systems over a Field k -- 3. Factoring Polynomials -- 4. Affine Algebraic Geometry: Algebraic Sets -- 5. Affine Algebraic Geometry: The Hilbert Theorems -- 6. Affine Algebraic Geometry: Irreducibility -- 7. Affine Algebraic Geometry: Regular Functions and Morphisms I -- 8. The Laurent Isomorphism Theorem -- 9. Affine Algebraic Geometry: Regular Functions and Morphisms II -- 10. The State Space: Realizations -- 11. The State Space: Controllability, Observability, Equivalence -- 12. Affine Algebraic Geometry: Products, Graphs and Projections -- 13. Group Actions, Equivalence and Invariants -- 14. The Geometric Quotient Theorem: Introduction -- 15. The Geometric Quotient Theorem: Closed Orbits -- 16. Affine Algebraic Geometry: Dimension -- 17. The Geometric Quotient Theorem: Open on Invariant Sets -- 18. Affine Algebraic Geometry: Fibers of Morphisms -- 19. The Geometric Quotient Theorem: The Ring of Invariants -- 20. Affine Algebraic Geometry: Simple Points -- 21. Feedback and the Pole Placement Theorem -- 22. Affine Algebraic

Geometry: Varieties -- 23. Interlude -- Appendix A: Tensor Products -- Appendix B: Actions of Reductive Groups -- Appendix C: Symmetric Functions and Symmetric Group Actions -- Appendix D: Derivations and Separability -- Problems -- References.

Sommario/riassunto

"An introduction to the ideas of algebraic geometry in the motivated context of system theory." Thus the author describes his textbook that has been specifically written to serve the needs of students of systems and control. Without sacrificing mathematical care, the author makes the basic ideas of algebraic geometry accessible to engineers and applied scientists. The emphasis is on constructive methods and clarity rather than abstraction. The student will find here a clear presentation with an applied flavor, of the core ideas in the algebra-geometric treatment of scalar linear system theory. The author introduces the four representations of a scalar linear system and establishes the major results of a similar theory for multivariable systems appearing in a succeeding volume (Part II: Multivariable Linear Systems and Projective Algebraic Geometry). Prerequisites are the basics of linear algebra, some simple notions from topology and the elementary properties of groups, rings, and fields, and a basic course in linear systems. Exercises are an integral part of the treatment and are used where relevant in the main body of the text. The present, softcover reprint is designed to make this classic textbook available to a wider audience.