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Soggetti	Algebras, Linear Mathematical physics Group theory Numerical analysis Computer science—Mathematics Linear Algebra Mathematical Physics Group Theory and Generalizations Numerical Analysis Mathematical Applications in Computer Science Àlgebra lineal Teoria de grups Llibres electrònics
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Part I: Introduction to Linear Algebra -- Vectors and Matrices -- Determinant and Vector Product in Physics -- Markov Matrix and its Spectrum: Towards Search Engines -- Special Relativity: Algebraic Point of View -- Part II: Introduction to Group Theory -- Groups and Isomorphism Theorems -- Projective Geometry in Computer Graphics -- Quantum Mechanics: Algebraic Point of View -- Part III: Polynomials and Basis Functions -- Polynomials and Their Gradient -- Basis

Functions: Barycentric Coordinates in 3D -- Part IV: Finite Elements in 3-D. - Automatic Mesh Generation -- Mesh Regularity -- Numerical Integration -- Spline: Variational Model in 3D -- Part V: Permuation Group in Quantum Chemistry -- Determinant and Electronic Structure -- Part VI: The Jordan Form -- The Jordan Form -- Jordan Decomposition -- Algebras and their Derivation -- Part VII: Linearization in Numerical Relativity -- Einstein Equations and their Linearization.

Sommario/riassunto

This textbook demonstrates the strong interconnections between linear algebra and group theory by presenting them simultaneously, a pedagogical strategy ideal for an interdisciplinary audience. Being approached together at the same time, these two topics complete one another, allowing students to attain a deeper understanding of both subjects. The opening chapters introduce linear algebra with applications to mechanics and statistics, followed by group theory with applications to projective geometry. Then, high-order finite elements are presented to design a regular mesh and assemble the stiffness and mass matrices in advanced applications in quantum chemistry and general relativity. This text is ideal for undergraduates majoring in engineering, physics, chemistry, computer science, or applied mathematics. It is mostly self-contained—readers should only be familiar with elementary calculus. There are numerous exercises, with hints or full solutions provided. A series of roadmaps are also provided to help instructors choose the optimal teaching approach for their discipline. The second edition has been revised and updated throughout and includes new material on the Jordan form, the Hermitian matrix and its eigenbasis, and applications in numerical relativity and electromagnetics. .