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Sommario/riassunto This book provides an up-to-date overview of results in rigid body dynamics, including material concerned with the analysis of nonintegrability and chaotic behavior in various related problems. The wealth of topics covered makes it a practical reference for researchers and graduate students in mathematics, physics and mechanics.

Contents Rigid Body Equations of Motion and Their Integration The Euler - Poisson Equations and Their Generalizations The Kirchhoff Equations and Related Problems of Rigid Body Dynamics Linear Integrals and Reduction Generalizations of Integrability Cases. Explicit Integration Periodic Solutions, Nonintegrability, and Transition to Chaos Appendix A : Derivation of the Kirchhoff, Poincaré - Zhukovskii, and Four-Dimensional Top Equations Appendix B: The Lie Algebra e(4) and Its Orbits Appendix C: Quaternion Equations and L-A Pair for the Generalized Goryachev - Chaplygin Top Appendix D: The Hess Case and Quantization of the Rotation Number Appendix E: Ferromagnetic Dynamics in a Magnetic Field Appendix F: The Landau - Lifshitz Equation, Discrete Systems, and the Neumann Problem Appendix G: Dynamics of Tops and Material Points on Spheres and Ellipsoids Appendix H: On the Motion of a Heavy Rigid Body in an Ideal Fluid with Circulation Appendix I: The Hamiltonian Dynamics of Self-gravitating Fluid and Gas Ellipsoids