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Nota di contenuto	Preface -- 1 Historical background -- 2 Geometry of gauge fields -- 3 Maxwell and Yang-Mills theory -- 4 Gravitation as a gauge theory -- 5 Einstein-Cartan theory -- 6 Teleparallelism -- 7 Yang's theory of gravity -- 8 BRST quantization of gravity -- 9 Gravitational instantons -- 10 Three-dimensional gravity -- 11 Spinor bundles -- 12 Chiral anomalies -- 13 Topological SL(5;R) gauge invariant action -- 14 Geometrodynamics and its extensions -- 15 Color Geometrodynamics -- 16 Geometrodynamical model of quark confinement?- Appendix A Notation and mathematical terms -- Appendix B Calculus of exterior forms -- Appendix C Lie groups.
Sommario/riassunto	This monograph aims to provide a unified, geometrical foundation of gauge theories of elementary particle physics. The underlying geometrical structure is unfolded in a coordinate-free manner via the modern mathematical notions of fibre bundles and exterior forms. Topics such as the dynamics of Yang-Mills theories, instanton solutions and topological invariants are included. By transferring these concepts

to local space-time symmetries, generalizations of Einstein's theory of gravity arise in a Riemann-Cartan space with curvature and torsion. It provides the framework in which the (broken) Poincaré gauge theory, the Rainich geometrization of the Einstein-Maxwell system, and higher-dimensional, non-abelian Kaluza-Klein theories are developed. Since the discovery of the Higgs boson, concepts of spontaneous symmetry breaking in gravity have come again into focus, and, in this revised edition, these will be exposed in geometric terms. Quantizing gravity remains an open issue: formulating it as a de Sitter type gauge theory in the spirit of Yang-Mills, some new progress in its topological form is presented. After symmetry breaking, Einstein’s standard general relativity with cosmological constant emerges as a classical background. The geometrical structure of BRST quantization with non-propagating topological ghosts is developed in some detail.