1. Record Nr. UNINA9910782273303321

Autore	Ungar Abraham A
Titolo	Analytic hyperbolic geometry and Albert Einstein's special theory of relativity [[electronic resource] /] / Abraham Albert Ungar
Pubbl/distr/stampa	Singapore ; ; Hackensack, NJ, : World Scientific, c2008
ISBN	1-281-91199-2 9786611911997 981-277-230-8
Descrizione fisica	1 online resource (649 p.)
Disciplina	516.9
Soggetti	Special relativity (Physics) Geometry, Hyperbolic
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 605-620) and index.
Nota di contenuto	Contents; Preface; Acknowledgements; 1. Introduction; 1.1 A Vector Space Approach to Euclidean Geometry and A Gyrovector Space Approach to Hyperbolic Geometry; 1.2 Gyrolanguage; 1.3 Analytic Hyperbolic Geometry; 1.4 The Three Models; 1.5 Applications in Quantum and Special Relativity Theory; 2. Gyrogroups; 2.1 Definitions; 2.2 First Gyrogroup Theorems; 2.3 The Associative Gyropolygonal Gyroaddition; 2.4 Two Basic Gyrogroup Equations and Cancellation Laws; 2.5 Commuting Automorphisms with Gyroautomorphisms; 2.6 The Gyrosemidirect Product Group; 2.7 Basic Gyration Properties 3. Gyrocommutative Gyrogroups3.1 Gyrocommutative Gyrogroups; 3.2 Nested Gyroautomorphism Identities; 3.3 Two-Divisible Two-Torsion Free Gyrocommutative Gyrogroups; 3.4 From M obius to Gyrogroups; 3.5 Higher Dimensional M obius Gyrogroups; 3.6 M obius gyrations; 3.7 Three-Dimensional M obius gyrations; 3.8 Einstein Gyrogroups; 3.9 Einstein Coaddition; 3.10 PV Gyrogroups; 3.11 Points and Vectors in a Real Inner Product Space; 3.12 Exercises; 4. Gyrogroup Extension; 4.1 Gyrogroup Extension; 4.2 The Gyroinner Product, the Gyronorm, and the Gyroboost; 4.3 The Extended Automorphisms 4.4 Gyrotransformation Groups4.5 Einstein Gyrotransformation Groups; 4.6 PV (Proper Velocity) Gyrotransformation Groups; 4.7 Galilei Transformation Groups; 4.8 From Gyroboosts to Boosts; 4.9 The

Sommario/riassunto

This book presents a powerful way to study Einstein's special theory of relativity and its underlying hyperbolic geometry in which analogies with classical results form the right tool. It introduces the notion of vectors into analytic hyperbolic geometry, where they are called <i>gyrovectors</i>. Newtonian velocity addition is the common vector addition, which is both commutative and associative. The resulting vector spaces, in turn, form the algebraic setting for the standard model of Euclidean geometry. In full analogy, Einsteinian velocity addition is a gyrovector addition, which is both