1. Record Nr. UNINA9910300249403321

Autore	Luna-Elizarrarás M. Elena
Titolo	Bicomplex holomorphic functions : the algebra, geometry and analysis of bicomplex numbers / / by M. Elena Luna-Elizarrarás, Michael Shapiro, Daniele C. Struppa, Adrian Vajiac
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Birkhäuser, , 2015
ISBN	3-319-24868-5
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (231 p.)
Collana	Frontiers in Mathematics, , 1660-8046
Disciplina	515.98
Soggetti	Functions of complex variables Mathematical physics Functions of a Complex Variable Several Complex Variables and Analytic Spaces Mathematical Applications in the Physical Sciences
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 and index.
Nota di contenuto	Introduction -- 1.The Bicomplex Numbers -- 2.Algebraic Structures of the Set of Bicomplex Numbers -- 3.Geometry and Trigonometric Representations of Bicomplex -- 4.Lines and curves in BC -- 5.Limits and Continuity -- 6.Elementary Bicomplex Functions -- 7.Bicomplex Derivability and Differentiability -- 8.Some properties of bicomplex holomorphic functions -- 9.Second order complex and hyperbolic differential operators -- 10.Sequences and series of bicomplex functions -- 11.Integral formulas and theorems -- Bibliography.
Sommario/riassunto	The purpose of this book is to develop the foundations of the theory of holomorphicity on the ring of bicomplex numbers. Accordingly, the main focus is on expressing the similarities with, and differences from, the classical theory of one complex variable. The result is an elementary yet comprehensive introduction to the algebra, geometry and analysis of bicomplex numbers. Around the middle of the nineteenth century, several mathematicians (the best known being Sir William Hamilton and Arthur Cayley) became interested in studying number systems that extended the field of complex numbers. Hamilton

famously introduced the quaternions, a skew field in real-dimension four, while almost simultaneously James Cockle introduced a commutative four-dimensional real algebra, which was rediscovered in 1892 by Corrado Segre, who referred to his elements as bicomplex numbers. The advantages of commutativity were accompanied by the introduction of zero divisors, something that for a while dampened interest in this subject. In recent years, due largely to the work of G.B. Price, there has been a resurgence of interest in the study of these numbers and, more importantly, in the study of functions defined on the ring of bicomplex numbers, which mimic the behavior of holomorphic functions of a complex variable. While the algebra of bicomplex numbers is a four-dimensional real algebra, it is useful to think of it as a “complexification” of the field of complex numbers; from this perspective, the bicomplex algebra possesses the properties of a one-dimensional theory inside four real dimensions. Its rich analysis and innovative geometry provide new ideas and potential applications in relativity and quantum mechanics alike. The book will appeal to researchers in the fields of complex, hypercomplex and functional analysis, as well as undergraduate and graduate students with an interest in one- or multidimensional complex analysis.