1. Record Nr. UNINA9910438141003321

Autore	Kirillov A.A
Titolo	A Tale of Two Fractals / / by A.A. Kirillov
Pubbl/distr/stampa	New York, NY : , : Springer New York : , : Imprint : Birkhäuser, , 2013
ISBN	0-8176-8382-8
Edizione	[1st ed. 2013.]
Descrizione fisica	1 online resource (138 p.)
Classificazione	00A0926A3028A8057S
Disciplina	514.742
Soggetti	Mathematics Visualization Special functions Geometry Mathematical analysis Analysis (Mathematics) Algebra Applied mathematics Engineering mathematics Special Functions Analysis Applications of Mathematics
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 & index.
Nota di contenuto	Introduction -- Part 1. The Sierpiski Gasket -- Definition and General Properties -- The Laplace Operator on the Sierpiski Gasket. - Harmonic Functions on the Sierpiski Gasket -- Part 2. The Apollonian Gasket -- Introduction -- Circles and Disks on Spheres -- Definition of the Apollonian Gasket -- Arithmetic Properties of Apollonian Gaskets -- Geometric and Group-Theoretic Approach -- Many-Dimensional Apollonian Gaskets -- Bibliography.
Sommario/riassunto	Since Benoit Mandelbrot's pioneering work in the late 1970s, scores of research articles and books have been published on the topic of fractals. Despite the volume of literature in the field, the general level of theoretical understanding has remained low; most work is aimed either at too mainstream an audience to achieve any depth or at too

specialized a community to achieve widespread use. Written by celebrated mathematician and educator A.A. Kirillov, A Tale of Two Fractals helps bridge this gap, providing an original treatment of fractals that is at once accessible to beginners and sufficiently rigorous for serious mathematicians. The work is designed to give young, non-specialist mathematicians a solid foundation in the theory of fractals. As its title suggests, this book focuses primarily on two fractals: the Sierpiski gasket and the Apollonian gasket. Over the course of the book, they are developed and discussed in various contexts. Along with fundamental definitions and properties, some of the key concepts and approaches covered include * the Laplace operator * harmonic functions * generalized numerical systems * Descartes' theorem * rational paramaterizations * group action on fractals * generalization to multiple dimensions In addition to its explicit goal of providing undergraduate and graduate students with a sound foundation in fractal theory, A Tale of Two Fractals serves to enhance their overall understanding of mathematics by drawing on a wide variety of techniques from other subfields. Furthermore, by virtue of the subject matter, it provides a unique opportunity for students to develop their capacity for recognizing patterns and formulating interesting questions. It is therefore a valuable text not only for any course on fractals or hyperbolic geometry, but also for any survey course with an aim of honing creative-problem-solving skills.