# Epub free The elements of cantor sets with applications (2023)

a systematic and integrated approach to cantor sets and their applications to various branches of mathematics the elements of cantor sets with applications features a thorough introduction to cantor sets and applies these sets as a bridge between real analysis probability topology and algebra the author fills a gap in the current literature by providing an introductory and integrated perspective thereby preparing readers for further study and building a deeper understanding of analysis topology set theory number theory and algebra the elements of cantor sets provides coverage of basic definitions and background theorems as well as comprehensive mathematical details a biography of georg ferdinand ludwig philipp cantor one of the most significant mathematicians of the last century chapter coverage of fractals and self similar sets sums of cantor sets the role of cantor sets in creating pathological functions p adic numbers and several generalizations of cantor sets a wide spectrum of topics from measure theory to the monty hall problem an ideal text for courses in real analysis topology algebra and set theory for undergraduate and graduate level courses within mathematics computer science engineering and physics departments the elements of cantor sets is also appropriate as a useful reference for researchers and secondary mathematics education majors the concept of thickness assigns to every cantor set in the real line a number from 0 to infinity symbol it was known that for some pairs of numbers the intersection of cantor sets with such numbers as thicknesses may be just one point and that in some other cases with certain conditions the intersection must contain a cantor set the author gives a complete answer to the problem of determining all pairs of thicknesses for which the intersection may be a single point and all the pairs of thicknesses for which the intersection must contain a cantor set he also considers the problem of how often as one cantor set is being translated over another one the intersection of the two cantor sets contains a cantor set for every positive decreasing summable sequence a a i we can construct a cantor set c a associated with a these cantor sets are not necessarily self similar their dimensional properties and measures have been studied in terms of the sequence a in this thesis we extend these results to a more general collection of cantor sets we study their hausdorff and packing measures and compare the size of cantor sets with the more refined notion of dimension partitions the properties of these cantor sets in relation to the collection of cut out sets are then considered the multifractal spectrum of $\mathbf{p}$ cantor measures on these cantor sets are also computed we then focus on the special case of homogeneous cantor sets and obtain a more accurate estimate of their exact measures finally we prove the $l$ $p$ improving property of the $\mathbf{p}$ cantor measure on a homogeneous cantor set as a convolution operator abstract using cantor sets examples are constructed of sets with capacity zero such that certain projections of the square have positive capacity furthermore a set of positive capacity such that its projections in many directions have capacity zero is constructed georg cantor was made famous by introducing the cantor set in his works of mathematics this project focuses on different cantor sets and their properties the ternary cantor set is the most well known of the cantor sets and can be best described by its construction this set starts with the closed interval zero to one and is constructed in iterations the first iteration requires removing the middle third of this interval the second iteration will remove the middle third of each of these two remaining intervals these iterations continue in this fashion infinitely finally the ternary cantor set is described as the intersection of all of these intervals this set is particularly interesting due to its unique properties being uncountable closed length of zero and more a more general cantor set is created by taking the intersection of iterations that remove any middle portion during each iteration this project explores the ternary cantor set as well as variations in cantor sets such as looking at different middle portions removed to create the sets the project focuses on attempting to generalize the properties of these cantor sets in this paper the intersections of deleted digits cantor sets and their fractal dimensions were analyzed previously it had been shown that for any dimension between 0 and the dimension of the given deleted digits cantor set of the real number line a translate of the set could be constructed such that the intersection of the set with the translate would have this dimension here we consider deleted digits cantor sets of the complex plane with gaussian integer bases and show that the result still holds we define a family of deleted digits cantor sets which satisfy specific constraints on the generating set of digits we explore the structure and dimension of the intersection of a deleted digits cantor set with its translate by a real value t these results apply directly to the traditional middle thirds cantor set as well as regular and uniform cantor sets we show that this family includes certain irregular sets which have not been previously analyzed our methods not only reveal the upper and lower bounds for the minkowski dimension but also uncover a formula for calculating the dimension of these intersections when specific conditions are met we investigate a class of cantor sets which has the striking property such that their hausdorff dimensions are strictly less than their packing dimensions while their corresponding measures regarded as borel measures on the sets are equivalent furthermore we give another class of cantor sets which is a subset of the above and give some statistical interpretation on their dimensions and

measures

## The Elements of Cantor Sets *2013-07-29*

a systematic and integrated approach to cantor sets and their applications to various branches of mathematics the elements of cantor sets with applications features a thorough introduction to cantor sets and applies these sets as a bridge between real analysis probability topology and algebra the author fills a gap in the current literature by providing an introductory and integrated perspective thereby preparing readers for further study and building a deeper understanding of analysis topology set theory number theory and algebra the elements of cantor sets provides coverage of basic definitions and background theorems as well as comprehensive mathematical details a biography of georg ferdinand ludwig philipp cantor one of the most significant mathematicians of the last century chapter coverage of fractals and self similar sets sums of cantor sets the role of cantor sets in creating pathological functions p adic numbers and several generalizations of cantor sets a wide spectrum of topics from measure theory to the monty hall problem an ideal text for courses in real analysis topology algebra and set theory for undergraduate and graduate level courses within mathematics computer science engineering and physics departments the elements of cantor sets is also appropriate as a useful reference for researchers and secondary mathematics education majors

## Constructing Generalized Cantor Sets with Iterated Function Systems *1991*

the concept of thickness assigns to every cantor set in the real line a number from 0 to infinity symbol it was known that for some pairs of numbers the intersection of cantor sets with such numbers as thicknesses may be just one point and that in some other cases with certain conditions the intersection must contain a cantor set the author gives a complete answer to the problem of determining all pairs of thicknesses for which the intersection may be a single point and all the pairs of thicknesses for which the intersection must contain a cantor set he also considers the problem of how often as one cantor set is being translated over another one the intersection of the two cantor sets contains a cantor set

## *Intersections of Thick Cantor Sets 1992*

for every positive decreasing summable sequence a a i we can construct a cantor set c a associated with a these cantor sets are not necessarily self similar their dimensional properties and measures have been studied in terms of the sequence a in this thesis we extend these results to a more general collection of cantor sets we study their hausdorff and packing measures and compare the size of cantor sets with the more refined notion of dimension partitions the properties of these cantor sets in relation to the collection of cut out sets are then considered the multifractal spectrum of mathbf p cantor measures on these cantor sets are also computed we then focus on the special case of homogeneous cantor sets and obtain a more accurate estimate of their exact measures finally we prove the l p improving property of the mathbf p cantor measure on a homogeneous cantor set as a convolution operator

## A Sum of Cantor Sets *1996*

abstract using cantor sets examples are constructed of sets with capacity zero such that certain projections of the square have positive capacity furthermore a set of positive capacity such that its projections in many directions have capacity zero is constructed

## A New Class of Cantor Sets *1985*

georg cantor was made famous by introducing the cantor set in his works of mathematics this project focuses on different cantor sets and their properties the ternary cantor set is the most well known of the cantor sets and can be best described by its construction this set starts with the closed interval zero to one and is constructed in iterations the first iteration requires removing the middle third of this interval the second iteration will remove the middle third of each of these two remaining intervals these iterations continue in this fashion infinitely finally the ternary cantor set is described as the intersection of all of these intervals this set is particularly interesting due to its unique properties being uncountable closed length of zero and more a more general cantor set is created by taking the intersection of iterations that remove any middle portion during each iteration this project explores the ternary cantor set as well as variations in cantor sets such as looking at different middle portions removed to create the sets the project focuses on attempting to generalize the properties of these cantor sets

## Some Aspects of Cantor Sets *2014*

in this paper the intersections of deleted digits cantor sets and their fractal dimensions were analyzed previously it had been shown that for any dimension between 0 and the dimension of the given deleted digits cantor set of the real number line a translate of the set could be constructed such that the intersection of the set with the translate would have this dimension here we consider deleted digits cantor sets of the complex plane with gaussian integer bases and show that the result still holds

## *Multi-model Cantor Sets 2001*

we define a family of deleted digits cantor sets which satisfy specific constraints on the generating set of digits we explore the structure and dimension of the intersection of a deleted digits cantor set with its translate by a real value t these results apply directly to the traditional middle thirds cantor set as well as regular and uniform cantor sets we show that this family includes certain irregular sets which have not been previously analyzed our methods not only reveal the upper and lower bounds for the minkowski dimension but also uncover a formula for calculating the dimension of these intersections when specific conditions are met

## The Difference Set of Two Cantor Sets *1991*

we investigate a class of cantor sets which has the striking property such that their hausdorff dimensions are strictly less than their packing dimensions while their corresponding measures regarded as borel measures on the sets are equivalent furthermore we give another class of cantor sets which is a subset of the above and give some statistical interpretation on their dimensions and measures

## On the Magnification of Cantor Sets and Their Limit Models *1991*

## On Defining Sequences for Cantor Sets *2000*

## Cantor Sets *1993*

## Rigid Cantor Sets in R 3 with Simply Connected Complement *2004*

## *Capacities of Certain Cantor Sets 1993*

## Cantor Sets and Their Relation to Upper Semi-continuous Collections *1977*

## Rigid Cantor Sets in IR3 with Simply Connected Complement *2004*

## On the capacity of generalized cantor sets *1955*

## Embedding Cantor Sets in Manifolds *1965*

**Cantor Sets and Numbers with Restricted Partial Quotients [microform]** *1999*

**Cantor Sets and Numbers with Restricted Partial Quotients** *1999*

**Cantor Sets, Cantorvals, and Their Topological Structure** *2019*

**Dual Cantor Sets** *1996*

**Generalizaitons and Properties of the Ternary Cantor Set and Explorations in Similar Sets** *2017*

**On the Capacity of Generalized Cantor Sets, by Gunnar Af Hällström** *1955*

**Mat-report** *1993*

**A Characterization of Cantor Sets, Described by the Properties of Continued Fractions and Having Measure Zero, But which Can be Summed to Cover Intervals of Real Numbers** *1987*

**Intersections of Deleted Digits Cantor Sets with Gaussian Integer Bases** *2020*

*Intersections of Deleted Digits Cantor Sets with Their Translates* *2011*

**Projections of Cantor Sets, Simple Closed Curves, and Spheres** *1975*

**Self-similar Cantor Sets and Quasiregular Mappings** *1990*

**On the Analytic Capacity and Curvature of Some Cantor Sets with Non- $ \sigma $ -finite Length** *1995*

**Topological Conditions for the Existence of Absorbing Cantor Sets**

*1996*

**Fat, Symmetric, Irrational Cantor Sets** *1979*

***Dimensions of Measures on Perturbed Cantor Sets 2018***

**Removability of Cantor Sets for Hp-spaces** *1993*

***Limit Behavior of Favard Length of Cantor Sets 2023***

**An Evaluation of the Fractal Dimensions of Cantor Sets** *2019*

***Dimension of Harmonic Measure for Generalized Cantor Sets 1986***

**Stable Intersections of Regular Cantor Sets with Large Hausdorff Dimension** *1998*

***Minimal Cantor Sets 2016***

***On the Arithmetic Sum of Regular Cantor Sets 1995***