

# Space Filling Curves An Introduction With Applications In Scientific Computing Texts In Computational Science And Engineering

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### [Space Filling Curves An Introduction](#)

#### Space-Filling Curves An Introduction

2 1 Introduction This text is interpreted as a general introduction to the concept of space-filling curves (SFCs) It is mainly a résumé of the presentation I held on the subject for the Joint

#### SPACE-FILLING CURVES (SFC)

•Introduction •Type of Space-Filling Curves 1 The Peano Space-Filling Curves 2 The Hilbert Space-Filling Curves 3 The Sierpinski Space-Filling Curves 4 The Lebesgue Space-Filling Curves •Applications of Space-Filling Curves 2 SURJECTIVE MAPPING: The function is surjective (onto) if every element of the codomain is mapped

#### An inventory of three-dimensional Hilbert space-filling curves

1 Introduction A space-filling curve in  $d$  dimensions is a continuous, surjective mapping from  $\mathbb{R}$  to  $\mathbb{R}^d$  In the late 19th century Peano [9] described such

mappings for  $d=2$  and  $d=3$ . Since then, quite a number of space-filling curves have appeared in the literature, and space-filling curves have

### Space-Filling Curves

Space-Filling Curves Summary We begin with an example of a space-filling curve and demonstrate how it can be used to find a short tour through a set of points. Next we give a general introduction to space-filling curves and discuss properties of them. We then consider the space-filling curve heuristic for the traveling

### ON SPACE-FILLING CURVES AND THE HAHN-MAZURKIEWICZ ...

ON SPACE-FILLING CURVES AND THE HAHN-MAZURKIEWICZ THEOREM 3 Figure 1 The first, second and third iterations  $f_0$ ,  $f_1$ ,  $f_2$  of the sequence defining the Peano curve is, but the  $i$ 'th square is determined by the previous function  $f$

### Empirical Analysis of Space Filling Curves for Scientific ...

Space Filling Curves are frequently used in parallel processing applications to order and distribute inputs while preserving proximity. Several different metrics have been proposed for analyzing and comparing the efficiency of different space-filling curves, particularly in database settings. Here, we introduce a general new metric, called

### Space-filling curves of self-similar sets (I): iterated ...

space-filling curves Keywords: space-filling curve, linear GIFS, self-similar set, optimal parametrization Mathematics Subject Classification numbers: 28A80, 37A05, 37B10 (Some figures may appear in colour only in the online journal) 1 Introduction Since the monumental construction of Peano in 1890 ([22]), space-filling curves have fasci-

### HILBERT SPACE FILLING CURVE (HSFC) NEAREST NEIGHBOR ...

the use of space-filling curves to index the training data. In Skubalska-Rafajlowicz, the data was indexed using Peano and Sierpinski space-filling curves. They show that these curves were able to produce classification performance on par with the standard NN approach. Their experiments were on very small data sets in the range of 80 to 200.

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space-filling curves an introduction with applications in scientific computing 550 Stadium Mall Drive, West of such space-filling curves were later constructed by Hilbert in 1891, Moore in 1900, Lebesgue in 1904 space-filling curves pdf Sierpinski in 1912 and Schoenberg in 1938 SPACEFILLING CURVES April 11, 1995 revised April 1, 2003 Hans

### Using space-filling curves for multi-dimensional indexing

Using space-filling curves for multi-dimensional indexing Public Dr. Bisztray Dénes In medias res Public Switch to NoSQL store (HBase) Query is based on multiple properties Multi-dimensional indexing Space-filling curves • Brief introduction to indexes and databases • The „main topic“, i.e. problem statement and

### A Formal Analysis of Space Filling Curves for Parallel ...

A Formal Analysis of Space Filling Curves for Parallel Domain Decomposition Srikanta Tirthapura, Sudip Seal and Srinivas Aluru Department of Electrical and Computer Engineering Iowa State University, Ames, IA fsnt, skseal, alurug@iastate.edu Abstract Space-filling curves (SFCs) are widely used for parallel

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rendering space-filling curves in an aesthetically pleasing fashion, in opposition to the traditional manner of black lines on white backgrounds. These

techniques use color, line weight, and curved shapes, and can be applied to a wide variety of space-filling curves Introduction

**University of Florida, Gainesville, FL, USA Université ...**

Space-Filling Curves An Introduction with Applications in Scientific Computing The present book provides an introduction to using space-filling curves (SFC) as tools in scientific computing Special focus is laid on the representation of SFC and on resulting algorithms

**Efficient Neighbor-Finding on Space-Filling Curves arXiv ...**

Space-filling curves (SFC, also known as FASS-curves) are a useful tool in scientific computing and other areas of computer science to sequentialize multidimensional grids in a cache-efficient and parallelization-friendly way for storage in an array ...

**Parallelisation of Multiscale-Based Grid Adaptation using ...**

PARALLELISATION OF MULTISCALE-BASED GRID ADAPTATION USING SPACE-FILLING CURVES Kolja Brix 1, Silvia Sorana Melian 1, Siegfried Müller 1 and Gero Schieffer 2 Resumé Le concept des schémas de volumes numériques multi-échelles et adaptatifs a été développé et étudié pendant les dix dernières années

**On the Use of Space Filling Curves for Parallel ...**

On the Use of Space Filling Curves for Parallel Anisotropic Mesh Adaptation Frédéric Alauzet<sup>1</sup> and Adrien Loseille<sup>2</sup> <sup>1</sup> INRIA Paris-Rocquencourt, Projet Gamma, Domaine de Voluceau, BP 105, 78153 Le Chesnay cedex, France FredericAlauzet@inria.fr

**Dynamic Load Balancing Using Space-Filling Curves**

4 Dynamic Load Balancing Using Space-Filling Curves 41 The Load Balancing Problem Finite difference, finite element and finite volume methods for the solution of partial differential equations are based on meshes or grids These schemes typically result in a system of linear equations which can be solved by various numerical methods It is

**Hilbert and Sierpinski space-filling curves, and beyond**

Hilbert and Sierpinski curves are space-filling curves They are related to fractals, in that they have self-similar patterns That is, when we magnify one section of the fractal object, we find we are looking at a very similar version of the object, such ...

**Irregularity in Multi-Dimensional Space-Filling Curves ...**

space-filling curves are proposed, eg, [8, 44] Examples of space-filling curves are given in Figure 1 According to the classification in [8], space-filling curves are classified into two categories: recursive space-filling curves (RSFC) and non-recursive space-filling curves An RSFC is an SFC that

**Approximate covering detection among content-based ...**

on space filling curves Keywords Publish-subscribe, Subscription covering, Space filling curve Disciplines Computer Sciences | Electrical and Computer Engineering Comments This is a manuscript of an article published as Shen, Zhenhui, and Srikanta Tirthapura "Approximate covering detection among content-based subscriptions using space filling