SUPERFRACTALS ERRATA AND SUPPLEMENT (VERSION 0.2)

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Abstract. This document provides errata to the first edition of SuperFractals. Later versions will include new material. Initially it will be updated on a regular basis.

1. Introduction

SuperFractals, published by Cambridge University Press, has now been in print for a couple of months. I am indebted to Arin Chaudhuri, Uta Frieberg, Michael Porter and Jonathan Stephenson for pointing out the errors which I note and correct below.

I use the convention that "p.15 line 12" means the twelfth line down from the top line. The top line is the first line below the running title. Similarly "p.15 line -12" means the twelfth line up from the bottom.

2. Errata for Chapter 1

p.15 line -15: Replace "for all S$\in \mathbb{S}(\mathbb{X})$" by "for all S$\in \mathbb{S}(\mathbb{Y})$".

p.27 EXERCISE 1.5.15 line -2: Replace "*denote the shortest path*" by "*denote the arc-length of the shortest path*".

p.30 line -1:

$$\text{Replace } 0.\sigma_1\sigma_2\sigma_3...\sigma_m\overline{N} \text{ by } 0.\sigma_1\sigma_2\sigma_3...\sigma_m N\overline{0}.$$

p.31 line -8:

$$\text{Replace } \xi(\sigma) = \sum_{n=1}^{m} \frac{\sigma_n}{(N+1)^n} + \frac{1}{(N+1)^m} \text{ by } \xi(\sigma) = \sum_{n=1}^{m} \frac{\sigma_n}{(N+1)^n} + \frac{1}{(N+1)^{m+1}}.$$

p.32 EXERCISE 1.6.8 1:

$$\text{Replace } \prod_{k=1}^{m} (\frac{\sigma_k}{2} + 0.499) \text{ by } \sum_{k=1}^{m} \sigma_k (0.499)^{k-1}$$

and

$$\text{replace } \prod_{k=1}^{\infty} (\frac{\sigma_k}{2} + 0.499) \text{ by } \sum_{k=1}^{\infty} \sigma_k (0.499)^{k-1}.$$

p.42: **Topology generated by a basis**

The first paragraph should be replaced by the following one.

"Let $\{O_i : i \in \mathcal{I}\}$ be a collection of subsets of a space $\mathbb{X}$. Then the smallest topology $\mathbb{T}$ on $\mathbb{X}$ such that $O_i \in \mathbb{T}\ \forall\ i \in \mathcal{I}$ is called the topology **generated** by $\{O_i : i \in \mathcal{I}\}$. If

$$\mathbb{T} = \{O \subset \mathbb{X} : O = \bigcup_{i \in \mathcal{J}} O_i, \textit{ for some } \mathcal{J} \subset \mathcal{I}\}$$

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then $\{O_i : i \in \mathcal{I}\}$ is called a **basis** for $\mathbb{T}$. Then the open sets of $\mathbb{T}$ are exactly those that can be written as unions of members of the basis. Of course the sets in the basis, the individual O_i, are open in $\mathbb{T}$."

p.46 line 15 $\mathbb{T}_f(\mathbb{Y})$ is a topology on $\mathbb{Y}$, not on $\mathbb{X}$.

p.51, line 1 should have $g\colon [0,10) \subset \mathbb{R} \to \mathbb{R}$ instead of $g\colon [0,10) \subset \mathbb{R} \to \mathbb{R}^2$

p.54, line 1 The first sentence is wrong. It should say "The boundary of an open set contains no points of the open set."

p. 76 line -4. Replace the paragraph which begins "When the underlying metric..." by the following one:

When the underlying metric is d_Ω with $N > 3$ it is hard to make illustrations similar to Figures 1.37 and 1.38 because there exist too many equidistant points. For example, when $\Omega = \Omega_{\{1,2,\ldots,N\}}$ there exists a set containing N points each of which is at a distance 1/2 from all of the other points in the set. This implies that there does not exist an embedding $\xi : \Omega_{\{1,2,\ldots,N\}} \to \mathbb{R}^{N-2}$ such that $d_\Omega(\sigma,\omega) = d_{euclidean}(\xi(\sigma),\xi(\omega))$; if the latter were the case then there would exist in $\mathbb{R}^{N-2}$ a set containing more than N points, each of which is at unit euclidean distance from all other points in the set. The latter statement is not true, as demonstrated in Exercise 1.5.17. See also Figure 1.12.

p.76 EXERCISE 1.12.30: This exercise should read as follows: *"Prove that in the metric space $(\Omega_{\{1,2,\ldots,N\}}, d_{\Omega_{\{1,2,\ldots,N\}}})$ there exists a set of N points, each of which is at a distance $1/2^m$ from all other points in the set, for all $m = 1,2,\ldots$..*

p.81, line -9 replace $\mathbb{H}(\mathbb{H}(\mathbb{X})$ by $\mathbb{H}(\mathbb{H}(\mathbb{X}))$

3. Errata for Chapter 2

p.105, line 15 Replace $\cap$ by $\cup$.

p.118, line -7 Replace 1/8 by 1/4.

p.123, line -4 Replace $P(X)$ by $\mathbb{P}(\mathbb{X})$.

p.125, line 3 Replace $Lip_1(\mathbb{X})$ by $|h(x) - h(y)| \leq d(x,y)$.

p.132, line -12 Replace g_i in the matrix by k_i.

p.162, fig. 2.47 Replace first $(1.1, 1.1)$ by $(0.9, 0.9)$, and interchange (bottom left) with (bottom right).

p.169, Ex. 2.7.19 The bottom middle entry of the right-hand matrix should be 1.232, not 0.1232.

4. Errata for Chapter 3

p.246, line 15 Replace f by F.

p.247, line -8 Delete $f\colon$.

p.248, line -5 Replace $\mathfrak{D}_{\mathfrak{Q}_\sigma}$ by $D_{\mathfrak{Q}_\sigma}$.

p.264, fig. 3.48 The addresses in the caption should be 1111, 1212 and 2222.

5. Errata for Chapter 4

p.328, lines 1 Replace l by $\bar{l}$.

p.331, line 20 Replace A by μ throughout.

p.332, line -4 Replace $\mathcal{F}^{\circ k}$ by $\mathcal{F}^{\circ r}$.

p.348, line -7 Replace $w_{\sigma_1}^{-1}(x)$ by $f_{\sigma_1}^{-1}(x)$.

p.355, line -1 Replace $d(x_1,x_2) + |y_1 - y_2|$ by $d(x_1,y_1) + |x_2 - y_2|$.

p.359, lines 18-19 Replace $\sigma 1\bar{0}$ by $\sigma 2\bar{1}$ and $\sigma 0\bar{1}$ by $\sigma 1\bar{2}$.

p.372, line 7 Replace $\phi_{\mathcal{F}}(\Omega_0)$ by $\phi_{\mathcal{F}}(\Omega_0) = A_0$.

6. Errata for Chapter 5

p.357, line 5: such *as* those.

p.371, line 7: Replace (4.11.1) not (4.16.1)

p.372, lines -10, -9: Interchange A_1 and A_2.

p.386, line 1 Replace "superfactals" by "superfractals".

p.394, line -14 $\mathbb{B}(\mathbb{H}(\mathbb{X}))$ should be changed to $\mathcal{B}(\mathbb{H}(\mathbb{X}))$

p.409, line 11 Replace Hausdorff metric by Monge-Kantorovitch metric.

p.410, line 3 The hyperbolic IFS with probabilities has been labelled as $\mathcal{F}_1 \circ \mathcal{F}_1$; but it should be $\mathcal{F}_1 \circ \mathcal{F}_2$.

pp.428-430: On these pages I refer to the Hausdorff dimensions of the graphs of fractal interpolations. This fractal dimension should be replaced by a different one, namely the capacity dimension. These dimensions are often, but not always, equal.

p.416, line 5 The notation $v_{v,l}$ is somewhat confusing; only the subscript v is meant to vary.

p.416, line 11: Replace f^a by f_a.

p.430, line -3: heirarchical.

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