

# The Ultimate Guide to Functional And Shape Data Analysis from Springer In Statistics

Functional and shape data analysis is a rapidly growing field of study that aims to analyze data that can be represented as functions or shapes. This approach allows researchers to gain a deeper understanding of complex datasets, uncover hidden patterns, and make meaningful predictions. One of the leading publishers in this field is Springer, which offers a vast collection of books and resources in statistics.

## What is Functional Data Analysis?

Functional data analysis (FDA) deals with objects that are not simple data points but rather curves or functions. In other words, instead of observing a single value at each time point, we have a whole curve or function that describes the behavior of the variable of interest. This technique is especially useful in fields such as biomedical research, economics, finance, and environmental science where data is often collected in the form of functional measurements.

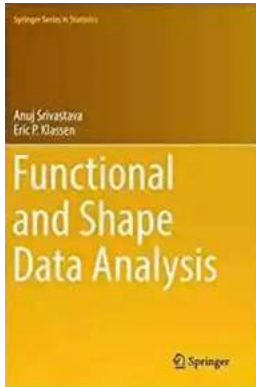
The goal of FDA is to extract meaningful information from these curves or functions, rather than focusing on individual data points. By analyzing the overall shape and pattern of the data, researchers can identify trends, anomalies, and relationships that might not be evident when only traditional statistical methods are used.

## Functional and Shape Data Analysis (Springer Series in Statistics)

by Anuj Srivastava(1st ed. 2016 Edition, Kindle Edition)

★★★★☆ 4.8 out of 5

Language : English



File size : 22836 KB  
Screen Reader : Supported  
Print length : 465 pages  
X-Ray for textbooks : Enabled



## Shape Data Analysis

Shape data analysis, a subset of functional data analysis, focuses on the analysis of geometric shapes. It is concerned with comparing, classifying, and understanding shapes using mathematical and statistical techniques. This field has applications in various areas including computer vision, image analysis, and medical imaging.

One common application of shape data analysis is in the study of biological shapes. Researchers can use this approach to analyze the shapes of organs, cells, or organisms and draw conclusions about their characteristics, growth patterns, or abnormalities.

## Springer In Statistics: A Reliable Resource

When it comes to functional and shape data analysis, Springer is one of the most reputable publishers in the field of statistics. They offer a wide range of books, journals, and online resources that cover various aspects of this rapidly evolving discipline.

Some of the notable books published by Springer in this area include:

- "Functional Data Analysis with R and MATLAB" by James Ramsay, Giles Hooker, and Spencer Graves.
- "Applied Functional Data Analysis: Methods and Case Studies" by J. O. Ramsay and Bernard W. Silverman.
- "Statistical Shape Analysis" by Ian L. Dryden and Kanti V. Mardia.

In addition to books, Springer also publishes several journals that publish research on functional and shape data analysis. Some of these journals include "Journal of Statistical Software," "Computational Statistics & Data Analysis," and "Biometrical Journal."

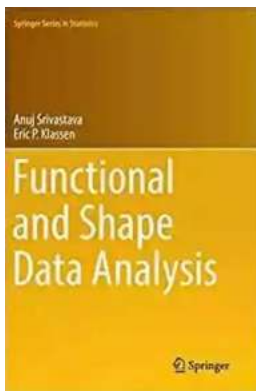
## Why Choose Springer for Functional and Shape Data Analysis?

There are several reasons why Springer is the go-to publisher for researchers in the field of functional and shape data analysis:

1. **Expert Authors:** Springer works with renowned experts in the field who have deep knowledge and experience in analyzing functional and shape data. Their publications provide valuable insights and practical guidance.
2. **Comprehensive Coverage:** Springer offers a comprehensive collection of books and journals that cover various topics within functional and shape data analysis. Whether you are a beginner or an advanced researcher, you will find resources tailored to your needs.
3. **High-Quality Content:** Springer is known for its rigorous peer-review process, ensuring that the published material meets the highest standards of quality and accuracy.
4. **Stay Updated:** As functional and shape data analysis is a rapidly evolving field, Springer keeps researchers updated with the latest advancements

through their publications.

, functional and shape data analysis is an exciting and promising field that offers unique insights into complex datasets. Springer in statistics is an excellent resource for researchers and students interested in this area, providing a wide range of books and journals that cover various aspects of functional and shape data analysis. Whether you are a beginner or an experienced researcher, Springer has the resources to support your journey in exploring this fascinating discipline.



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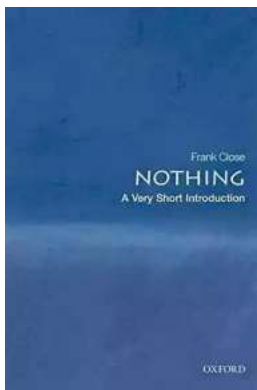
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This textbook for courses on function data analysis and shape data analysis describes how to define, compare, and mathematically represent shapes, with a focus on statistical modeling and inference. It is aimed at graduate students in analysis in statistics, engineering, applied mathematics, neuroscience, biology, bioinformatics, and other related areas. The interdisciplinary nature of the broad range of ideas covered—from introductory theory to algorithmic implementations and some statistical case studies—is meant to familiarize graduate students with an array of tools that are relevant in developing computational solutions for shape and related analyses. These tools, gleaned from geometry, algebra, statistics,

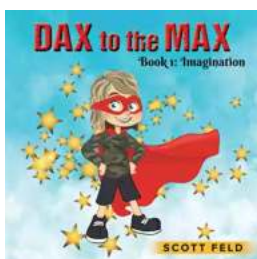
and computational science, are traditionally scattered across different courses, departments, and disciplines; Functional and Shape Data Analysis offers a unified, comprehensive solution by integrating the registration problem into shape analysis, better preparing graduate students for handling future scientific challenges.

Recently, a data-driven and application-oriented focus on shape analysis has been trending. This text offers a self-contained treatment of this new generation of methods in shape analysis of curves. Its main focus is shape analysis of functions and curves—in one, two, and higher dimensions—both closed and open. It develops elegant Riemannian frameworks that provide both quantification of shape differences and registration of curves at the same time. Additionally, these methods are used for statistically summarizing given curve data, performing dimension reduction, and modeling observed variability. It is recommended that the reader have a background in calculus, linear algebra, numerical analysis, and computation.



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