



TUTORIALS *in*
CONTEMPORARY
NONLINEAR METHODS
for the **BEHAVIORAL SCIENCES**



EDITED BY MICHAEL A. RILEY & GUY C. VAN ORDEN

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PREFACE

Chapters 2-8 in this volume were contributed by speakers at an October, 2003, workshop, "Nonlinear Methods in Psychology," held at George Mason University in Fairfax, VA, and sponsored by the National Science Foundation. The workshop served two specific purposes. The first was to provide the attendees (mostly graduate students) with tutorial lectures describing concepts and methods from nonlinear dynamics that have already shed light on problems in the behavioral sciences. The emphasis was on recurrence quantification analysis (Chapters 2, 3, 4) and fractals (Chapters 5, 6, 7), but the workshop included other, more established topics, such as applications of nonlinear dynamics to speech perception (Chapter 8), social group coordination, and human development. In addition to the authors of the chapters, we thank Stephen Guastello and Paul van Geert for their presentations at the workshop. The second purpose of the workshop was to provide the present authors with critical feedback. The chapters are intended to present these topics to a target audience of graduate students and other researchers who might lack specialized backgrounds often required to grasp the concepts and use the methods with real data. The students who attended the workshop also served as ad hoc reviewers of the chapters in this volume. They were instructed specifically to evaluate the chapters in terms of accessibility and usefulness for beginners. The reviewers and authors were thus charged with very difficult tasks that they enthusiastically embraced.

By design, this volume does not represent the full breadth of nonlinear methods that have been or are currently being used by researchers in the behavioral sciences. Instead, we focus on a narrow

subset of contemporary methods that are less well represented in other methods texts. The narrow focus allowed us to present formal, yet accessible, descriptions of methods and concepts along with detailed applications in the behavioral sciences. We hope to provide the reader with an in-depth, tutorial-style treatment—a detailed guide for the particular methods and a launching point for further studies. Thanks to the very hard work of the authors and the reviewers, we believe this volume achieves these goals.

This volume is somewhat unique also in the publication format and venue. Our aim was to balance availability and access with the utmost standards of academic rigor. We chose to publish the volume online (initially on the National Science Foundation's web site, linked from the web page of the Program in Perception, Action, and Cognition) so that it may be widely available and free of charge. By making the volume freely and easily available we may ensure that the methods and concepts described herein have a maximal impact. We chose a traditional format for the text (rather than a web-page format with hyperlinks) to maintain the feel of a typical, edited academic book. However, the electronic format also allowed us to post supplements to several of the chapters. Liebovitch and Shehadeh (Chapter 5) requested that their *PowerPoint* file be made available along with the chapter, so we have posted that file in addition to the PDF-formatted chapter. Pellicchia and Shockley (Chapter 3) made available the data set that they discuss in detail in their chapter. Aks (Chapter 7) plans to release a *Flash* demo of her eye movement model that we will also make available with this volume. We also provide links to pages from which free data analysis software can be obtained.

We are grateful to the authors and reviewers for their contributions to this project. We also acknowledge the support of the National Science Foundation, Social, Behavioral, & Economic Sciences Directorate, Division of Behavioral & Cognitive Sciences. Philip Rubin and Peg Barrat, Directors of the Division of Behavioral & Cognitive Sciences, supported this project from its inception to its completion. We especially thank Christy Contreras and Philip Johnson at NSF and Chris Kello, Debbie Kranz, and Daragh Sibley at George Mason University. Chris Kello arranged that we could meet at George Mason. Christy, Debbie, and Daragh handled the logistics of the workshop. Philip Johnson set the book up on the NSF website.

The views expressed in this volume are the authors' and do not necessarily represent those of the National Science Foundation.

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