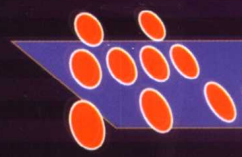

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影印版

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应用多元统计分析方法

DALLAS E. JOHNSON

高等教育出版社
Higher Education Press

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出版者的话

在我国已经加入WTO、经济全球化的今天，为适应当前我国高校各类创新人才培养的需要，大力推进教育部倡导的双语教学，配合教育部实施的“高等学校教学质量与教学改革工程”和“精品课程”建设的需要，高等教育出版社有计划、大规模地开展了海外优秀数学类系列教材的引进工作。

高等教育出版社和Pearson Education，John Wiley & Sons，McGraw-Hill，Thomson Learning等国外出版公司进行了广泛接触，经国外出版公司的推荐并在国内专家的协助下，提交引进版权总数100余种。收到样书后，我们聘请了国内高校一线教师、专家、学者参与这些原版教材的评介工作，并参考国内相关专业的课程设置和教学实际情况，从中遴选出了这套优秀教材组织出版。

这批教材普遍具有以下特点：(1) 基本上是近3年出版的，在国际上被广泛使用，在同类教材中具有相当的权威性；(2) 高版次，历经多年教学实践检验，内容翔实准确、反映时代要求；(3) 各种教学资源配套整齐，为师生提供了极大的便利；(4) 插图精美、丰富，图文并茂，与正文相辅相成；(5) 语言简练、流畅、可读性强，比较适合非英语国家的学生阅读。

本系列丛书中，有Finney、Weir等编的《托马斯微积分》(第10版，Pearson)，其特色可用“呈传统特色、富革新精神”概括，本书自20世纪50年代第1版以来，平均每四五年就有一个新版面世，长达50余年始终盛行于西方教坛，作者既有相当高的学术水平，又热爱教学，长期工作在教学第一线，其中，年近90的G.B.Thomas教授长年在MIT工作，具有丰富的教学经验；Finney教授也在MIT工作达10年；Weir是美国数学建模竞赛委员会主任。Stewart编的《微积分》(第5版，Thomson Learning) 配备了丰富的教学资源，是国际上最畅销的微积分原版教材，2003年全球销量约40余万册，在美国，占据了约50%~60%的微积分教材市场，其用户包括耶鲁等名牌院校及众多一般院校。本系列丛书还包括Anton编的经典教材《线性代数及其应用》(第8版，Wiley)；Jay L.Devore编的优秀教材《概率论与数理统计》(第5版，Thomson Learning) 等。在努力降低引进教材售价方面，高等教育出版社做了大量和细致的工作，这套引进的教材体现了一定的权威性、系统性、先进性和经济性等特点。

通过影印、翻译、编译这批优秀教材，我们一方面要不断地分析、学习、消化吸收国外优秀教材的长处，吸取国外出版公司的制作经验，提升我们自编教材的教学资源配套标准，使我国高校教材建设水平上一个新的台阶；与此同时，我们还将尝试组织海外作者和国内作者合编外文版基础课数学教材，并约请国内专家改编部分国外优秀教材，以适应我国实际教

学环境。

这套教材出版后，我们将结合各高校的双语教学计划，开展大规模的宣传、培训工作，及时地将本套丛书推荐给高校使用。在使用过程中，我们衷心希望广大高校教师和同学提出宝贵的意见和建议。

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2004 年 4 月 20 日

Preface

I once attended a conference at which George Box stated that "Statistics is much too important to be left entirely to statisticians." A bit later, Walt Federer stated that "Science is much too important to be left entirely to scientists." Both of these famous statisticians were correct! Never before in the history of science and statistics has there been a greater need for interactions and collaborations between scientists and statisticians. This book helps to facilitate such collaborations and interactions. I have been fortunate in that I have had substantial contact with scientists during my tenure at Kansas State University. These collaborations have greatly influenced my approach to teaching multivariate methods. I believe that multivariate methods are too important to be taught only to statisticians.

Furthermore, I have been teaching public seminars and college courses in applied multivariate analyses for the last 20 years. In these seminars and courses, students have posed many important questions that multivariate methods can help answer. As data sets grow in size, multivariate methods become ever more useful. Today's technologies make it very easy to collect large amounts of data; multivariate methods are needed to determine whether such massive amounts of data actually contain information. It has been said that while it is easy to collect data, it is much harder to collect information. Multivariate methods can help determine whether there is information in data, and they can also help to summarize that information when it exists.

To date, textbooks have emphasized only the theory of multivariate methods or only the application of the methods. Readers were given information that was either too advanced to apply or too elementary to illustrate the power of the methods. This text has broken the mold by focusing on the why, when, how, and what of multivariate analyses and answering the following questions:

Why should multivariate methods be used?

When should they be used?

How can they be used?

And what has been learned by the application of the methods?

Ideally, users of this book will have had a previous course in statistics that included multiple regression. Some familiarity with matrix algebra is desirable, but not crucial. My approach assumes familiarity with most of the statistical

concepts encountered in a first course in statistics, such as means and standard deviations, correlations, p-values, hypothesis tests, and confidence limits.

While this text is loaded with examples using real data, several of the exercises are directed at data sets that students are asked to provide from their own experiences. I find that students enjoy working with their own data. So, when I teach multivariate methods, I require each student to provide a data set for class use along with a description of the data's important features and the reasons behind its being collected. These data sets are then placed in a computer directory that every student in the class can access. I then use these data sets as much as possible when assigning exercises to the class. I strongly encourage instructors who use this book to do the same.

Other unique features of this text include:

- annotated computer output, emphasizing SAS and SPSS
- extensive use of graphics to explain concepts
- data disk that contains data files from text discussion and exercises, as well as computer commands used to create the analyses described throughout the text

I owe much of the development of this text to those who have participated in my seminars and courses. From these "students," I learned about their needs, their concerns, and their abilities. In writing this text, I have tried to address their needs and concerns, while recognizing their differing abilities.

Acknowledgments

I wish to express my appreciation to all who helped me with the development of this text. I am particularly grateful to the students at Kansas State University and students who have taken public seminars through the Institute of Professional Education. These students have provided numerous valuable suggestions that have greatly improved the content of this text. I would also like to thank Ms. Carolyn Crockett and Mr. Alexander Kugushev for their valuable suggestions. I would like to thank the following reviewers for their helpful comments: Marcia Gumpertz, North Carolina State University; John E. Hewett, University of Missouri, Columbia; Linda S. Hynan, Baylor University; Dipak Jain, Northwestern University; Lincoln Moses, Stanford University; Mack C. Shelley II, Iowa State University; Eric Smith, Virginia Polytech Institute; and Richard Sundheim, St. Cloud State University. I also thank Mrs. Jane Cox for her help in creating many of the formulas in this text. Finally, I would like to thank my parents, Chet and Dorothy Johnson, for giving me the opportunity for furthering my education and my wife, Erma, for the help and support that she provided during this endeavor.

Dallas Johnson

Contents