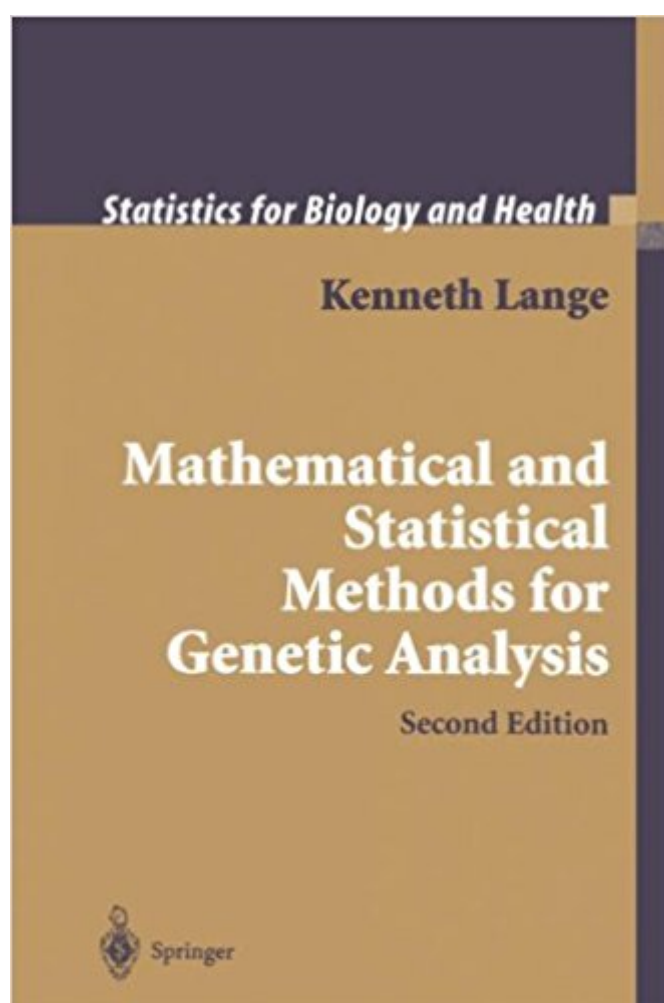


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# Mathematical And Statistical Methods For Genetic Analysis (Statistics For Biology And Health)



## Synopsis

Written to equip students in the mathematical sciences to understand and model the epidemiological and experimental data encountered in genetics research. This second edition expands the original edition by over 100 pages and includes new material. Sprinkled throughout the chapters are many new problems.

## Book Information

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## Customer Reviews

From the reviews of the second edition: "This book is an excellent resource for statisticians and applied mathematicians seeking an overview of models and formalisms in use in a wide collection of generic analysis processes." *Journal of the American Statistical Association*, June 2005

"Genetics is a subject that has always attracted the attention of statisticians back to the time that Mendel did his discoveries. The current book realizes this and tries to provide a gentle introduction to a wide range of statistical topics in genetics. I highly recommend this book for Master's students wishing to see many interesting applications of statistics in genomics. On their way through this book, they will be rewarded with knowledge of a wide range of statistical topics." (Dr A. Di Bucchianico, *Kwantitatieve Methoden*, Vol. 72B38, 2006) "More than 100 pages have been added in this Second Edition. The strength of this book is that it provides the foundations and rigorous details of mathematical and statistical methodologies that are applied in genetics. A nice feature of this book is that there are about a dozen problems for solution

at the end of each chapter, which will be useful for the serious reader." (Partha P. Majumder, *Sankhya*, Vol. 65 (3), 2003) "This monograph is the second edition of Lange's 1997 work, increased by more than 100 pages. Several chapters of the first edition have been supplemented by new material. The book is intended for readers with basic knowledge in theoretical statistics, calculus and linear algebra. Summarizing, this monograph can be recommended to all who want to connect their knowledge of mathematical statistics and genetics and learn about the statistical solutions for genetical research problems." (C. Becker, *Metrika*, September, 2003) "The second edition of this book by Ken Lange continues to present a very broad coverage of mathematical and statistical methods in the analysis of genetic data. The text has something to offer both mathematicians already experienced in genetics, as well as those with little experience in the area. The book allows readers to appreciate the enormous contribution that Lange has made to the area and will hopefully inspire them (in Lange's words) 'to create new models and methods for analyzing genetic data'." (Lyle C. Gurrin and John L. Hopper, *Statistics in Medicine*, Vol. 23, 2004) "This is an excellent book written in the same crisp and clear style as the first edition. It has enough in detail of the underpinning genetics to allow the mathematicians and statisticians to gain an understanding sufficient to see the challenge and richness of the area. It is both a useful reference source and a suitable introduction. This is a book I am happy to recommend highly, and I look forward to the third edition in a few years time." (C Cannings, *Heredity*, Issue 92, 2004) "The revolution in molecular genetics during the past decade has led to an avalanche of new data whose analysis requires increasingly sophisticated mathematical, statistical and computational methods. This book provides an up-to-date introduction to several of the most important mathematical and statistical methods developed for this purpose. This is a major text that will be most useful for researchers and students of mathematics or statistics interested or engaged in the analysis of genetic data." (R. Bärger, *Monatshefte für Mathematik*, Vol. 139 (3), 2003) "Mathematical and Statistical Methods for Genetic Analysis is written to equip students in the mathematical sciences to understand and model the epidemiological and experimental data encountered in genetics research. Mathematical, statistical, and computational principles relevant to this task are developed. Many specialized topics are covered that are currently accessible only in journal articles. This second edition expands the original edition by over 100 pages and includes new material." (*Zentralblatt für Didaktik*, June, 2002) "The first edition of this book appeared in 1997 and filled an important gap by covering in a unified setting topics dispersed in the research literature. This second edition is considerably larger, updating the first

edition and adding some new topics. There are two new chapters "New Topics". Several new sections have also been added to existing chapters "New Topics". (Carlos A. Braumann, Zentralblatt MATH, Vol. 991 (16), 2002)

This book covers all the right topics but it's too condensed and mixed up for students.

This second edition updates the first with the many advances in the rapidly growing field of genetics. It provides a nice treatment of the mathematical and stochastic models that are useful in genetic studies. It is a little disappointing that it does not go into the microarray technology that has become so important for experimentation in the last few years. Other recent books that cover statistical aspects of genetic research are Weir (1996) "Genetic Data Analysis II" Sinauer Associates (publisher) and Yang (2000) "Introduction to Statistical Methods in Modern Genetics" Gordon and Breach Science Publishers.

This book has an excellent coverage on the mathematical subtleties of genetics. The complicated theories are complimented by numerous examples. The exercise at the end of each chapter has a collection of probing questions that tests the understanding of the topics covered in the respective chapter. However, there is no discussion on association studies and quantitative traits which are two of the most active areas of genetic epidemiology. Moreover, the coverage on linkage is not adequate.

The book has an excellent coverage of the mathematical subtleties of genetics. Theories are illustrated through numerous examples and the exercises at the end of each chapter contain probing questions which would test the understanding of the topics covered in the respective chapters. However, there are no chapters devoted to quantitative traits and association analysis, which are currently active areas of research. The coverage of linkage is also not adequate.

This book is not for the novice dabbling in statistical genetics. This is a highly sophisticated, thought provoking book targeted to individuals with considerable mathematical ability and training. As such, this book is an invaluable tool for individuals hoping to make a real impact in the field of statistical genetics. I particularly enjoyed the chapter on Markov Chain Monte Carlo methods for pedigree data.

I'm interested in molecular genetics, this seems to be more about population genetics. There is some material, towards the back, about phylogeny. I can bash that a bit to make it match my needs, but it's still a bit of a stretch. It seems to be a pretty good presentation of population genetics, the kind of genetics taught in high schools in the 70s. I can't comment on this book's merits, but I can warn the biochem types to spend their money elsewhere.

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