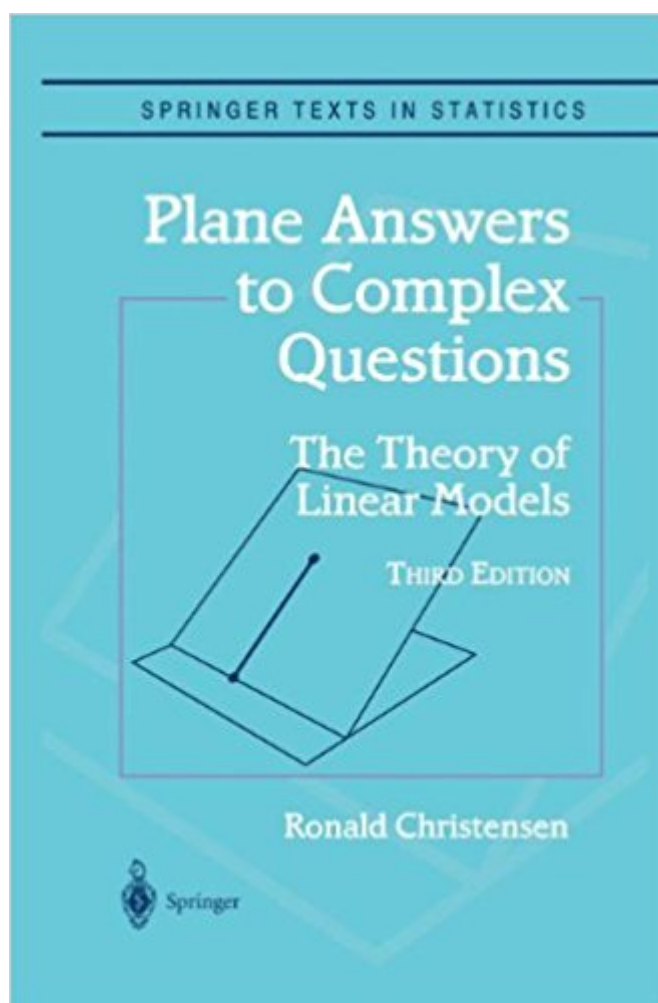


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# Plane Answers To Complex Questions: The Theory Of Linear Models (Springer Texts In Statistics)



## Synopsis

This textbook provides a wide-ranging introduction to the use and theory of linear models for analyzing data. The authors emphasis is on providing a unified treatment of linear models, including analysis of variance models and regression models, based on projections, orthogonality, and other vector space ideas. Every chapter comes with numerous exercises and examples that make it ideal for a graduate- level course. All of the standard topics are covered in depth. In addition, the book covers topics that are not usually treated at this level, but which are important in their own right. The author, Ronald Christensen, is a Professor of Statistics at the University of New Mexico.

## Book Information

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## Customer Reviews

From the reviews of the third edition: "This well-written and interesting book can serve as a textbook for a graduate-level course in linear model theory and its applications, and as a reference book for a wide range of definitions and results associated with particular linear models." Journal of the American Statistical Assoc. "The following quotations are taken from the (same) reviewer's comments on the second edition (Short Book Reviews, Vol.17/1, April 1997, p.4): The book "retains its fairly mathematical character... The writing style is inviting... friendly and affable... The computing aspects of regression are de-emphasized and the text leans more towards well-prepared students." All are still true, and I once again recommend the book for the indicated target audience." ISI Short Book Reviews, Vol. 22/3, 2002 "This book with the unusual title has been quite popular because of its lucid treatment. What I like most about the book is that many important observations have been

made in an entertaining manner. • In this edition the idea of identifiability has rightly been given more emphasis than estimability, which sets this book apart from most other books on linear models. • I have always regarded this book as a must-read for serious users of linear models. The third edition makes it even better. • (Debasis Sengupta, *Sankhya*, Vol. 65 (4), 2003) "This is the third edition of a popular textbook in general linear models aimed at graduate students. • The appealing features of this book lie in its projection-based dogma and its thought-provoking conversational prose. It continues to serve as an authoritative, well-written, polished linear models text that is useful both as a reference and as a graduate course text." (Robert Lund, *Journal of the American Statistical Association*, Vol. 98 (463), September, 2003) "The book • retains its fairly mathematical character. The writing style is inviting, friendly and affable. The computing aspects of regression are de-emphasized and the text leans more towards well-prepared students. • All are still true, and I once again recommend the book for the indicated target audience." (N. R. Draper, *Short Book Reviews*, Vol. 22 (3), 2002) "This 3rd edition, like the preceding editions, illustrates the practical applications of projective approach to linear models. • elegant treatment of identifiability and estimability and their connection. • Excellent examples are used to illustrate the effect of high leverage. • The intended audience for this book appears to be first-year graduate students. • I feel that *Plane Answers to Complex Questions* is a nice addition to the literature on linear models. • excellent references for practitioners." (Felix Famoye, *Technometrics*, Vol. 45 (2), May, 2003)

This textbook provides a wide-ranging introduction to the use and theory of linear models for analyzing data. The author's emphasis is on providing a unified treatment of linear models, including analysis of variance models and regression models, based on projections, orthogonality, and other vector space ideas. Every chapter comes with numerous exercises and examples that make it ideal for a graduate-level course. All of the standard topics are covered in depth: ANOVA, estimation including Bayesian estimation, hypothesis testing, multiple comparisons, regression analysis, and experimental design models. In addition, the book covers topics that are not usually treated at this level, but which are important in their own right: balanced incomplete block designs, testing for lack of fit, testing for independence, models with singular covariance matrices, variance component estimation, best linear and best linear unbiased prediction, collinearity, and variable selection. This new edition includes a more extensive discussion of best prediction and associated ideas of  $R^2$ , as well as new sections on inner products and perpendicular projections for more general spaces and Milliken and Graybill's generalization of Tukey's one degree of freedom for nonadditivity test.

This book is very suitable for graduate students wishing to learn some linear algebra. It covers a lot of more recent topics such as mixed models. While Dr. Christensen's writing is very clear, a lot more examples and/or exercises would definitely help to illustrate his points. For example, in section 2.4 he claims that "it's immaterial to use MSE or MLE [as] they will lead to identical confidence intervals and tests for  $\sigma^2$ ". This can be easily made as an exercise in chapter 3, where he discusses hypothesis testing. At least so that the students can see his point well. Moreover, I would appreciate it if he put like 5 or 6 exercises that make the students integrate every aspect they learned so far (like section 4.3 exercises). Practically, everything past chapter 9 is theoretical. I would appreciate it if he puts examples and/or exercises. I believe that the BLUP of section 12.2 should be put right after section 6.3. Current placement on chapter 12 makes it a bit disruptive to read. In addition, I think he should put more exercises in appendix A and B since they give the required linear algebra background for students, especially appendix B about Kronecker product and Tensor. I think he also needs to mention about  $[A(x) B]' = [A'(x) B']$  in section B.5 since it's needed in chapter 7. While I understand that those appendices are background materials, I would think that more examples would also help, instead of just list of theorems. Other than that, it's a pretty solid book.

Textbook for stat phd course. Good one

This is a pretty good textbook for the linear model. If you have backgrounds in experimental design and matrix theory. Then this book will help you a lot. Some people may recommend the Searle's linear model. But Searle's book may be too focus on the theories therefore not too many applications. If you are looking for a book for your linear model class. You might choose this one. Since it will help for your first step on the Linear model.

The book has rave reviews from other professors. Here in lies the problem. From a students perspective the book is very confusing and hard to follow. All the examples in the first part of the book (they are scarce) are based off of one system listed in the first chapter. The questions for review sometimes have nothing to do with the chapter they are located and may require definitions presented in other chapters or other books. Notations are sometimes tricky and often not defined clearly (sometimes tucked away in a paragraph in appendices and not referenced by the index). The overall method of the book is somewhat clear, but needs a few more revisions until I would recommend this book to anyone.

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