regression structure may be the primary focus. The marginalized latent variable models allow a flexible choice between modelling the marginal means or the conditional means. The marginalized transition models separate the dependence on the exposure variables from the dependence on previous response values. Orthogonality properties between the mean and the dependence parameters in a marginalized model secure robustness for the marginal means. Marginalized models further allow for simple procedures to determine a suitable dependence model for the data.

Chapter 12 on time-dependent covariates is also new. The temporal order between key exposure and response events is emphasized and exogenous and endogenous covariates are formally defined. When covariates are endogenous, then meaningful targets for inference need to be formulated as well as valid methods of estimation. A longitudinal study on maternal stress, child illness and maternal employment illustrates concepts. The scientific questions include (i) Is there an association between maternal employment and stress? (ii) Is there an association between maternal employment and child illness? (iii) Do the data provide evidence that maternal stress causes child illness? Since stress may be in the causal pathway that leads from employment to illness no adjustment is made for the daily stress indicators when evaluating the dependence of illness on employment. Similarly no adjustment is made for illness in the analysis of employment and stress. Question (iii) raises issues such as 'does illness at day t depend on prior stress measured at day $(t - k)$' and 'does illness on day $(t - k)$ predict stress on day t'. A covariate which is both a predictor for the response and is predicted by earlier responses is endogenous. No standard regression methods are available to obtain causal statements when dealing with endogenous covariates. Targets for inference are discussed in terms of counterfactual outcomes. Causal effects refer to interventions in the entire population rather than among possibly select, observed subgroups. Focus is on an average response after assignment of the covariate value rather than the average response in subgroups after simply observing the covariate status. The g-computation algorithm of Robins is presented as well as estimation using inverse probability of treatment weighting (IPTW).

Chapter 13 discusses approaches to dealing with incomplete data in longitudinal studies, with emphasis on random and informative missing data mechanism. Likelihood inference and generalized estimating equations when data are missing at random are dealt with. Selection models and pattern mixture models are presented for dropout processes and sensitivity analyses are recommended when informative missing data is suspected. Chapter 14 discusses additional topics, including non-parametric modelling of the mean response, non-linear regression models, joint modelling of longitudinal measurements and recurrent events and multivariate longitudinal data.

Like its predecessor, the second edition of 'Analysis of Longitudinal Data' provides an excellent bridge between novel concepts in theoretical statistics and their potential use in applied research. In particular, I would recommend for anyone dealing with time varying covariates to read chapter 12 carefully. It can—and should—change the way in which data analysis is thought of and typically carried out. Some of the original papers on this topic are easily accessible, while others are more difficult to penetrate. This makes the presentation in chapter 12 all the more valuable and important.

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4. BAYESIAN DATA ANALYSIS (2nd edn). Andrew Gelman, John B. Carlin, Hal S. Stern and Donald B. Rubin (eds), Chapman & Hall/CRC, Boca Raton, 2003. No. of pages: xxv + 668. Price: $59.95. ISBN 1-58488-388-X

The past 15 years have seen a remarkable increase in the use of Bayesian methods in real applications. This implies that increasing numbers of statisticians are learning Bayesian methods, teaching them to their students, and discussing them with their collaborators. It is therefore important that good basic teaching materials be available, including textbooks for undergraduate and graduate students, as well as for researchers wishing to follow a course of self-study. The 1995 first edition of this very popular book proved to be an excellent resource for all three of these audiences.

The first editions's success lay largely in the choice of material to be included and excluded. While beginning with simple single parameter models, the book quickly progresses to more realistic multi-parameter and hierarchical models that form the core of much Bayesian analysis today. As the title announces, the focus is squarely on data analysis, with topics such as linear and nonlinear models, missing data and model criticism at the forefront, and a wealth of solid practical advice sprinkled evenly throughout. Thus, unlike Berger's landmark book [1] of 10 years earlier, little space is given to philosophical comparisons of the different schools of statistical thought, and only a single examples-oriented chapter is devoted to the decision theoretic approach to Bayesian analysis. On the other hand, while there are dozens of detailed examples, the book does not go as far as the recent titles by Congdon [2, 3] in displaying the range of complex models available to a Bayesian analyst, although it does go much further than strictly introductory books on Bayesian analysis [4, 5]. While it does not have the detailed chapter long examples of Berry and Stangl [6], many examples are to medicine. It is not as theoretical as the offerings by Bernardo and Smith [7] or O'Hagan [8], but elementary Bayesian theory is discussed where needed. Overall, by taking the middle path, it is simply the best all round modern book focussed on data analysis currently available.

One drawback to the first edition was that only a relatively short chapter on computation including Markov chain Monte Carlo (MCMC) was included, despite the key role played by these techniques in the rise of Bayesian analysis in practice. Thus, naive readers were perhaps led to believe that these techniques played a more minor role than was in fact the case. Readers were also left somewhat on their own when it came to the details of computation, as no software or generic algorithms were presented. Therefore, one needed to consult other books on computation [9, 10] and software [11] to analyse data beyond the examples in the book. This criticism is partially addressed in the second edition, with an entire new chapter and several additional sections on computation, including recent MCMC techniques, and an appendix briefly discussing programming in R and BUGS. The second edition also adds useful discussions of non-linear models and decision analysis, and a new chapter on the analysis of survey data. There is enough important additional material here that those with the first edition should seriously consider updating to the new version.

The 22 book chapters are structured into four main sections: Part I introduces the fundamentals of Bayesian analysis, including motivation and background, simple single and multi-parameter models, and large sample asymptotic inferences. Part II begins with an introduction to hierarchical models, before going on to chapters on model checking and improvement, accounting for the sampling design, and a short chapter on Bayesian interpretations of frequentist methods. The section concludes with a nice chapter titled 'General Advice', which could only have been written by a group of statisticians with years of practical experience. Part III is on computation, including both numerical and analytic approximations. Simple and more advanced MCMC methods are discussed. Part IV is entitled 'Regression Models', but in fact goes much further, as long with chapters on linear, generalized, non-linear and hierarchical regression, there are chapters on robust inference, mixture models, multivariate models including time series, missing data, and decision analysis.

There are also four appendices, which provide useful tables of standard families of distributions with their main properties, some proofs of asymptotic theorems, and computation.

Among the many examples are applications to medicine, including simple genetics, cancer mapping, bioassays, pharmacokinetics, noncompliance and radon measurements. There are also many illustrations in other fields (ranging from politics to chess), but similar models can be applied to clinical or epidemiological data, so that they remain relevant to biostatisticians. The examples of course do not cover everything a biostatistician will encounter, for example, survival analysis is not mentioned, but there are specialty books that fill in these gaps [6, 12].

Conclusion: This review has mentioned a number of books now available for learning about Bayesian statistics. Many others are also available, with new titles seeming to appear in ever increasing numbers each month. It is not reasonable to ask that any single volume be the only source needed to take a reader from no knowledge of Bayesian statistics to being an expert in all aspects, including philosophy, theory, modelling, and practical aspects of data analysis including computation. However, when students or colleagues ask me which book they need to start with in order to take them as far as possible down the road towards analysing their own data, Gelman *et al*. has been my answer since 1995. The second edition makes this an even more robust choice.

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Donald B.Rubin. Harvard University, Cambridge, Massachusetts. CHAPMAN & HALL/CRC. A CRC Press Company Boca Raton London New York Washington, D.C. This edition published in the Taylor & Francis e-Library, 2009. To purchase your own copy of this or any of Taylor & Francis or Routledgeâ€™s collection of thousands of eBooks. please go to www.eBookstore.tandf.co.uk. Library of Congress Cataloging-in-Publication Data Bayesian data analysis/Andrew Gelmanâ€¦[et al.].â€”2nd ed. p. cm.â€”(Texts in statistical science) Includes bibliographical references and index. ISBN 1-58488-388-X (alk. paper) 1. Bayesian Gelman, Andrew, John B. Carlin, Hal S. Stern, and Donald B. Rubin. 2003. Bayesian data analysis, 2nd ed. Boca Raton: Chapman and Hall/CRC.Google Scholar. Greene, William H. 2003. Econometric analysis, 5th ed. Upper Saddle River: Prentice Hall.Google Scholar. Haughton, Dominique, and Nguyen Phong. 2003. Bayesian analysis of poverty rates: The case of Vietnamese provinces. Journal of Modern Applied Statistical Methods 2(1): 189â€“194.Google Scholar. Hoeting, Jennifer A., David Madigan, Adrian E. Raftery, and Chris T. Volinsky. Bayesian Data Analysis, Third Edition (Chapman & Hall/CRC Texts in Statistical Science) 3rd (third) Edition by Gelman, Andrew, Carlin, John B., Stern, Hal S., Rubin, Donal (2013). Andrew Gelman. Unknown Binding. $90.90.Â Publisher : Chapman and Hall/CRC; 2nd edition (July 29, 2003). Language: : English. Hardcover : 690 pages. ISBN-10 : 158488388X. ISBN-13 : 978-1584883883. Item Weight : 2.4 pounds. Dimensions : 6.14 x 1.44 x 9.21 inches. Best Sellers Rank: #233,866 in Books (See Top 100 in Books). by Andrew Gelman (Author), John B. Carlin (Author), Hal S. Stern (Author), David B. Dunson (Author), Aki Vehtari (Author), Donald B. Rubin (Author) & 3 more. 4.6 out of 5 stars 92 ratings. See all formats and editions Hide other formats and editions. Amazon Price.Â Data Analysis Using Regression and Multilevel/Hierarchical Models by Andrew Gelman Paperback S$119.92. Ships from and sold by ShopSpell USA. Customers who viewed this item also viewed. A. Gelman, J. Carlin, H. Stern, and D. Rubin. Chapman and Hall/CRC, 2nd ed. edition, (2004). Links and resources. BibTeX key: gelmanbda04. search on: Google Scholar Microsoft Bing WorldCat BASE. Comments and Reviews. (0). There is no review or comment yet.