



Introduction to WinBUGS for Ecologists: Bayesian approach to regression, ANOVA, mixed models and related analyses

By Marc Kéry

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Introduction to WinBUGS for Ecologists introduces applied Bayesian modeling to ecologists using the highly acclaimed, free WinBUGS software. It offers an understanding of statistical models as abstract representations of the various processes that give rise to a data set. Such an understanding is basic to the development of inference models tailored to specific sampling and ecological scenarios. The book begins by presenting the advantages of a Bayesian approach to statistics and introducing the WinBUGS software. It reviews the four most common statistical distributions: the normal, the uniform, the binomial, and the Poisson. It describes the two different kinds of analysis of variance (ANOVA): one-way and two- or multiway. It looks at the general linear model, or ANCOVA, in R and WinBUGS. It introduces generalized linear model (GLM), i.e., the extension of the normal linear model to allow error distributions other than the normal. The GLM is then extended to contain additional sources of random variation to become a generalized linear mixed model (GLMM) for a Poisson example and for a binomial example. The final two chapters showcase two fairly novel and nonstandard versions of a GLMM. The first is the site-occupancy model for species distributions; the second is the binomial (or N-) mixture model for estimation and modeling of abundance.

- Introduction to the essential theories of key models used by ecologists
- Complete juxtaposition of classical analyses in R and Bayesian analysis of the same models in WinBUGS
- Provides every detail of R and WinBUGS code required to conduct all analyses
- Companion Web Appendix that contains all code contained in the book and additional material (including more code and solutions to exercises)

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Editorial Review

Review

"I don't believe this book was written with the goal of being treated as the primary text of an intro Bayesian statistics course. That said, it could prove to be a useful supplemental text for an introductory Bayesian course or even a linear models course. Although the book was geared towards ecologists, I believe it would be an excellent library addition for any applied modeler interested in applying Bayesian methodologies in their work." --**The American Statistician**

From the Back Cover

Introduction to WINbugs for Ecologists is an introduction to Bayesian statistical modeling, written for ecologists by an ecologist, using the widely available WinBUGS package. Examples are placed within a comprehensive and largely non-mathematical overview of linear, generalized linear (GLM), mixed and generalized linear mixed models (GLMM). This book will be of interest to any quantitative scientist who uses regression-type models, especially ecologists, agronomists, geologists, epidemiologists, sociologists, and psychologists. This book:

- Teaches by example rather than by equations.
- Contains examples based on simulated data along with fully commented R code for the generation of these data sets.
- Is full integrated with program R?all analyses are conducted by calling program WinBUGS from within program R.

Dr. Kéry is a population ecologist with the Swiss Ornithological Institute. He is the author of over 40 peer-reviewed journal articles on a wide range of topics, including the analysis of large-scale monitoring programs, demographic population analyses, experimental design for animal and plant surveys, and the population ecology of rare species.

About the Author

Dr Kery is a Population Ecologist with the Swiss Ornithological Institute and a courtesy professor ("Privatdozent") at the University of Zürich/Switzerland, from where he received his PhD in Ecology in 2000. He is an expert in the estimation and modeling of abundance, distribution and species richness in "metapopulation designs" (i.e., collections of replicate sites). For most of his work, he uses the Bayesian model fitting software BUGS and JAGS, about which he has published two books with Academic Press (2010 and 2012). He has authored/coauthored 70 peer-reviewed articles and four book chapters. Since 2007, and for a total of 103 days, he has taught 23 statistical modeling workshops about the methods in the proposed book at research institutes and universities all over the world.

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This Introduction to WinBUGS for Ecologists: Bayesian approach to regression, ANOVA, mixed models and related analyses tend to be reliable for you who want to certainly be a successful person, why. The reason why of this Introduction to WinBUGS for Ecologists: Bayesian approach to regression, ANOVA, mixed models and related analyses can be among the great books you must have will be giving you more than just simple examining food but feed you actually with information that might be will shock your prior knowledge. This book will be handy, you can bring it all over the place and whenever your conditions throughout the e-book and printed versions. Beside that this Introduction to WinBUGS for Ecologists: Bayesian approach to regression, ANOVA, mixed models and related analyses forcing you to have an enormous of experience for instance rich vocabulary, giving you demo of critical thinking that we all know it useful in your day activity. So , let's have it appreciate reading.

Nathanael Ma:

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