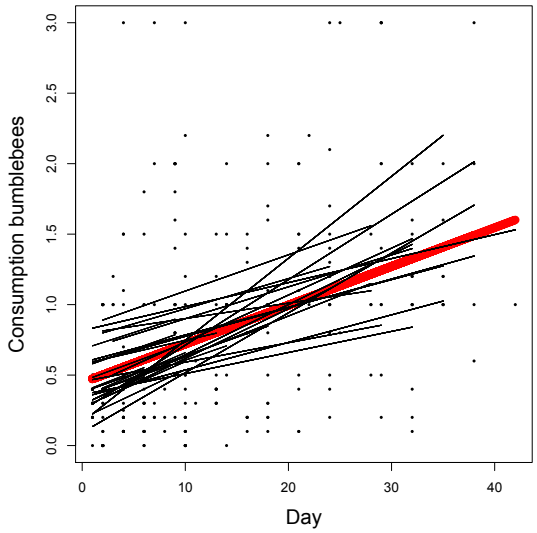
Introduction to Linear Mixed Effects Models and GLMM with R

Bayesian and frequentist approaches

Provided by: **Highland Statistics Ltd**

In cooperation with: Dr Graeme Clark, UNSW, Sydney, Australia



The course starts with a basic introduction to Bayesian statistics and MCMC, followed by an introduction to linear mixed effects models and generalised linear mixed effects models (GLMM) to analyse nested (also called hierarchical or clustered) data, e.g. multiple observations from the same animal, site, area, nest, patient, hospital, vessel, lake, hive, transect, etc.

During the course several case studies are presented, in which the statistical theory is integrated with applied analyses in a clear and understandable manner.

Throughout the course MCMC is executed in JAGS (free) via the package `R2jags` from within R. Bayesian and frequentist (lme4, nlme, glmmADMB) analyses are compared.

Date & Venue

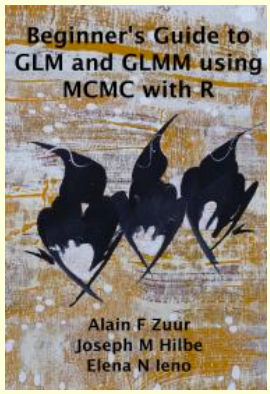
Date: 18 - 22 July 2016

Venue: UNSW, Sydney, Australia

Price: £500

Instructors: Dr. Alain Zuur
Dr. Elena Ieno

Authors of 8 books and providers of over 200 courses worldwide.



KEYWORDS

Introduction to Bayesian statistics and MCMC. Linear mixed effects models. GLMM. JAGS. R2jags. lme4. nlme, `glmmADMB`. Dealing with pseudo-replication. Nested data.

COURSE CONTENT

Monday

- Introduction to Bayesian statistics and MCMC.
  - Based on Chapter 10 in Zuur et al. (2016).
  - One exercise.

Tuesday - Wednesday

- Linear mixed effects models for nested data using MCMC.
  - Random intercept and slope models.
  - Sketching fitted values.
  - Two exercises.
  - Based on Chapter 4 in Zuur et al. (2013).
  - Comparing MCMC and lme4/nlme/glmmADMB results.
- Revision Poisson GLM and negative binomial GLM.

Thursday - Friday

- Analysis of nested count data using Poisson, negative binomial and Bernoulli GLMMs using MCMC.
  - Based on Chapters 2, 3, 5 - 7 in Zuur et al. (2013), and various chapters from Zuur & Ieno (2016).
  - Three exercises.
- Time allowing: Analysis of nested data using GLMMs with a binomial, gamma, beta and beta-binomial distribution (i.e. absence/presence data, proportional data, strictly positive continuous data).

Frequentist and Bayesian solution files of 25 - 30 exercises (all based on papers) using GLMMs with Gaussian, Poisson, negative binomial, Bernoulli, binomial, beta-binomial, gamma, and beta distributions are provided.

GENERAL INFORMATION

COURSE FEE: £500

Credit card payments are charged in GBP currency. UK participants are subject to 20% VAT. EU participants (but non-UK) are not subject to UK VAT, but need to provide their institutional VAT number. Non-EU participants are not subject to VAT.

COURSE TIMES AND DETAILS:

- 09.00am to 16.00pm including 1 hour lunch break and a 20 minutes break both morning and afternoon
- The course fee does not contain refreshments or lunch.

COURSE MATERIAL:

- Chapter 10 (Introduction Bayesian statistics) in Zuur & Ieno (2016). A *Beginner's Guide to Zero Inflated Models with R*.
- Various chapters from:
  - *A Beginner's Guide to GLM and GLMM using MCMC with R*. (2013).
  - A *Beginner's Guide to Zero Inflated Models with R*. (2016)
  - A copy is not included in the course fee.
- Pdf files of powerpoint presentations are provided
- The course can be followed without purchasing these books. These books are only available from www.highstat.com.

This is a non-technical course. **You need to bring your own laptop**. Terms and conditions see: www.highstat.com/statscourse.htm

PRE-REQUIRED KNOWLEDGE:

R, data exploration, multiple linear regression, generalised linear modelling (Poisson, negative binomial). A short revision is provided.

REGISTRATION AND INFORMATION ON COURSE CONTENT

http://www.highstat.com/CourseReg1.htm
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