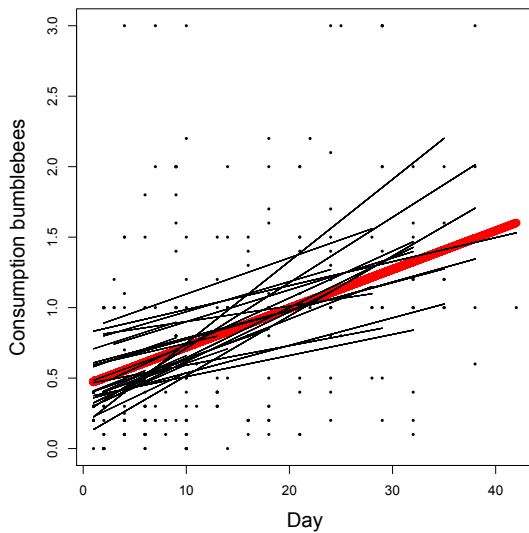


Introduction to Linear Mixed Effects Models and GLMM with R

Frequentist approaches

Provided by: Highland Statistics Ltd
In cooperation with:

cE3c - CCIAM, Faculty of Sciences, University of Lisbon, Portugal



The course starts with a short revision of multiple linear regression and generalised linear models, 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.

In the second part of the course GLMMs are applied on continuous, binary, proportional and count data using the Gaussian, Poisson, negative binomial, Bernoulli, binomial, beta, beta-binomial, gamma, generalised Poisson, and the Conway-Maxwell Poisson distributions.

We will also discuss how to add temporal or spatial correlation structures. We will be using nlme, lmer and glmmTMB.

Date & Venue

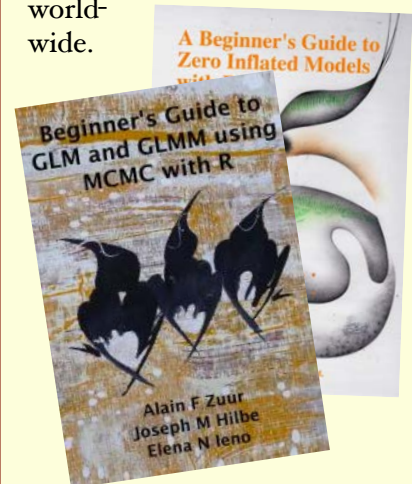
Date: 19 - 23 February 2018

Venue: PT Meeting Centre,
R. Bojador 47, Parque das Nações, Lisbon, Portugal

Price: 550 GBP

Instructors: Dr. Alain Zuur
Dr. Elena Ieno

Authors of 9 books and providers of over 200 courses world-wide.



KEYWORDS

Revision regression and GLM. Introduction to linear mixed effects models. GLMM. lme4. nlme, glmmTMB. Dealing with pseudo-replication. Nested data. Longitudinal data. Temporal correlation. Spatial correlation.



COURSE CONTENT

Monday

- Short revision of data exploration and multiple linear regression in R.
 - One exercise.
 - Introduction to matrix notation.
- Theory presentation for linear mixed effects models for nested data.
 - One exercise.

Tuesday

- Three linear mixed effects models
 - Random intercept and slope models.
 - Sketching fitted values.
 - Two way nested data. Crossed random effects.
 - Based on Chapter 4 in Zuur et al. (2013).
 - Comparing `lme4/nlme/glmmTMB` results.

Wednesday

- Short revision GLM
 - One exercise
- One Poisson GLMM exercise.
- One negative binomial exercise.

Thursday

- A series of exercises covering Bernoulli, binomial, gamma, beta, and beta-binomial GLMMs for the analysis of binary, proportional and strictly positive data with random effects.
- Time allowing: One exercise using generalised Poisson GLMM and Conway-Maxwell Poisson GLMM for underdispersion.

Friday

- Adding auto-regressive (AR1) and spatial correlation to GLMMs. Although R-INLA is the better option to deal with spatial and temporal correlation, these can also be added to frequentist GLMMs using `glmmTMB`.
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GENERAL INFORMATION

COURSE FEE: 550 GBP

- 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.
- The course fee excludes refreshments and lunch.
- You need to bring your own laptop.

COURSE TIMES:

- Monday - Thursday: 09.00am to 16.00pm including 1 hour lunch break and a 20 minutes break both morning and afternoon.
- Friday: 09.00am to 12.45pm including a 20 minutes break.

COURSE MATERIAL:

- Pdf files of all powerpoint presentations are provided
- These powerpoint files are based on 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)
 - Books are not included in the course fee. The course can be followed without purchasing these books.

PRE-REQUIRED KNOWLEDGE:

Working knowledge of R, data exploration, linear regression and GLM (Poisson, negative binomial, Bernoulli). This is a non-technical course.

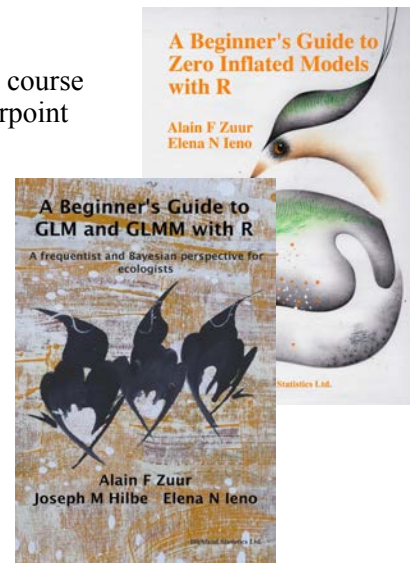
CANCELLATION POLICY:

What if you are not able to participate? Once participants are given access to course exercises with R solution codes, pdf files of book chapters, pdf files of powerpoint files and video solution files, all course fees are non-refundable. However, we will offer you the option to attend a future course or you can authorise a colleague to attend this course. Access information to the course website is provided 4 weeks before the start of the course.

Terms and conditions see: <http://highstat.com/index.php/sign-up2>

RECOMMEND LITERATURE:

- *A Beginner's Guide to GLM and GLMM using MCMC with R.* (2013).
- *A Beginner's Guide to Zero Inflated Models with R.* (2016).
- These books are available from www.highstat.com



REGISTRATION

<http://www.highstat.com> Payment via credit card or bank transfer

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