

Online live course using Zoom

Introduction to Linear Mixed-Effects Models, GLMM and Multivariate GLMM with R

Provided by: Highland Statistics Ltd

Course format

- Live online teaching is from 14.00-19.00 UK time (09.00-14.00 EST).
- There are seven 5-hour sessions over a 2-week period.
- The course includes a few theory presentations along with a large number of exercises using real data sets. Detailed, annotated R code will be provided, and a brief period will be set aside for practice before each exercise is discussed in depth.
- Please note that this is not a self-study course.

Brief outline

The course begins with a brief review of multiple linear regression and generalized linear models. This is followed by an introduction to linear mixed-effects models and generalized linear mixed-effects models (GLMM) for analyzing hierarchical or clustered data. Examples of such data include multiple observations from the same animal, site, area, nest, patient, hospital, vessel, lake, hive, transect, and so forth. These statistical techniques are designed to address dependency within your data.

In the second part of the course, we apply GLMMs to various types of data. This includes continuous data (e.g., biomass), binary data (e.g., the presence or absence of a disease), proportional data (e.g., % coverage), and count data. For these analyses, we employ several distributions: Poisson, negative binomial, Bernoulli, binomial, beta, ordered beta, Tweedie, and gamma.

In the final part of the course, we delve into multivariate GLMMs. These models allow for the analysis of multiple response variables within a single model using the 'gllvm' package.

2 hours face-to-face consultancy

Provided that you attend at least 80% of the Zoom sessions, you will get two hours face-to-face video consultancy with the instructors. You can use this to discuss your own data analysis.

A discussion board (access for 12 months) allows for interaction on course content between instructors and participants.

Date and format

Dates: 28 and 30 November, 1, 4, 5, 6 and 7 December 2023

Price: £500

Included: 2 hours face-to-face video chat about your data. Conditions apply.

Instructors: Dr. Alain Zuur
Dr. Elena Ieno

Authors of 12 books and providers of over 300 courses

Maximum participants: 20



COURSE CONTENT

Preparation material (containing on-demand video):

- Revision exercise on multiple linear regression.
- Introduction to matrix notation.

Module 1 (Zoom sessions 1 and 2)

- General introduction.
- Theory presentation for linear mixed-effects models for nested data.
- Two exercises on linear mixed-effects models with random intercepts.
- Exercise showing how to apply a two-way nested linear mixed-effects model.

Module 2 (Zoom session 2 and 3)

- Exercise on linear mixed-effects models with random intercepts and slopes.
- Revision exercise Poisson GLM and negative binomial GLM.
- Introduction to DHARMA.
- Exercise on Poisson GLMM.

Module 3 (Zoom sessions 3 and 4)

- Exercise on Negative binomial GLMM.
- Exercise on two-way nested and crossed random effects in a GLMM.
- Exercise showing how to apply a Bernoulli GLMM for the analysis of absence-presence data.
- Exercise showing how to apply a binomial GLMM for the analysis of proportional data.

Module 4 (Zoom sessions 5 and 6)

- Exercise showing how to apply a beta GLMM for the analysis of coverage data.
- Exercise showing how to apply an ordered beta GLMM for the analysis of coverage data that includes zeros and/or ones.
- Exercise showing how to apply a gamma GLMM for the analysis of continuous positive data.
- Exercise showing how to apply a Tweedie GLMM for the analysis of continuous positive data (with zeros).

Module 5 (Zoom sessions 6 and 7)

- Catching up.
- Theory presentation on multivariate GLMM.
- Three exercises showing the application of multivariate GLMM using the `gllvm` package.

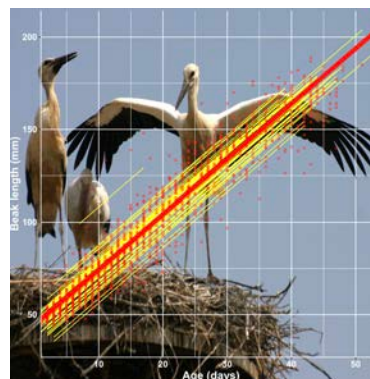
We will predominately use the R package `glmmTMB` for the GLMM exercises. Multivariate GLMMs will be fitted using `gllvm`.

Course material is partly based on:

- Zuur, Hilbe, Ieno (2013). *Beginner's Guide to GLM and GLMM with R*.

PRE-REQUIRED KNOWLEDGE:

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



GENERAL INFORMATION

COURSE FEE: £500

- Credit card payments are charged in GBP currency.
- VAT charge:
 - Non-EU participants (including Norway) are not subject to UK VAT.
 - UK participants are charged 20% VAT.
 - We do not have to charge VAT to EU participants who provide their [institutional VAT number](#).
 - EU participants who do not provide a VAT number will be charged VAT at their national rate.
 - Canadian participants are subject to GST/HST tax.

COURSE TIMES:

- All sessions:
 - 14.00-19.00 UK time (09.00-14.00 EST)
 - Including a 30-minutes lunch break and two short 15 minutes tea/coffee breaks.
- You can use this link for a time zone converter: <https://www.timeanddate.com/>

	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7
14.00-19.00 (UK time)	28 November	30 November	1 December	4 December	5 December	6 December	7 December

FREE 2-HOUR FACE-TO-FACE MEETING

Provided that you attend 80% of the Zoom sessions, the course fee includes a 2-hour face-to-face meeting with one or both instructors. You can discuss your own data, but we strongly advise that the statistical topics are within the content of the course. The 2-hours consultancy needs to be consumed in two 1-hour sessions, and will take place at a mutual convenient time. It is not transferable. The meetings needs to take place within 12 months after the last live zoom module. If attendance is between 50-80%, we will offer you 1 hour face-to-face consultancy. If attendance is less than 50%, we will not offer face-to-face consultancy.

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 certain 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.

GENERAL

- Please ensure that you have system administration rights to install R and R packages on your computer.
- Instructions what to install are on the course website.
- Zoom sessions will not be recorded.
- In order to receive a certificate, you need to attend at least 80% of the zoom live sessions.
- The minimum number of participants is 6. If fewer people register, we will cancel and provide a full refund.

REGISTRATION

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Payment via credit card or bank transfer

