

Onsite course - Wageningen, The Netherlands

Zero-inflated GAMs for the analysis of spatial and spatial-temporal correlated data using R-INLA

Provided by: Highland Statistics Ltd

We start with an introduction to Bayesian statistics and show how to execute Poisson and negative binomial GLMs in R-INLA. We then discuss zero-inflated GLMs for count data and continuous data, and show how to execute such models in R-INLA.

In the second part of the course, we discuss generalised additive models (GAM) and show how to execute these models in R-INLA. In the third part we extend the zero-inflated GAMs with spatial, and spatial-temporal dependency.

During the course, several case studies are presented, integrating statistical theory with applied analyses in a clear and understandable manner. Throughout the course, we will use the R-INLA package in R. This is a non-technical course.

Pre-required knowledge

Participants should be familiar with data exploration, linear regression and basic GLMs (i.e. Poisson and negative binomial GLM) in R. The course does contain revision/preparation material with on-demand videos.

1 hour face-to-face

The course includes a 1-hour face-to-face video chat with the instructors (to be used after the course). You are invited to apply the statistical techniques discussed during the course on your own data and if you encounter any problems, you can ask questions during the 1-hour face-to-face chat.

A discussion board, accessible for 12 months, facilitates interaction on course content between instructors and participants after the course.

Onsite course in Wageningen, The Netherlands.

Venue: Hotel de Nieuwe Wereld. Marijkeweg 5. 6709 PE Wageningen. The Netherlands.

Dates:
• 23-27 September 2024.

Price: £500.

Included: 1 hour face-to-face video chat about your data.

Instructors:

- Dr. Alain Zuur.
- Dr. Elena Ieno.



COURSE CONTENT

Preparation material (with on-demand video):

- Linear regression exercise in R.
- Poisson/negative binomial GLM exercise in R.
- Matrix notation.
- DHARMa for model validation.

Monday:

- General Introduction.
- Brief introduction to Bayesian Analysis. Conjugate priors. Diffuse versus informative priors.
- Theory presentation on R-INLA.
- Exercise on executing a Poisson/NB GLM in R-INLA.
- Theory presentation on zero-inflated GLM for count data.
- Exercise on executing a zero-inflated Poisson/NB GLM in R-INLA.

Tuesday:

- Catching up.
- Theory presentation on hurdle models for count data and continuous data.
- Exercise showing how to execute a zero-altered Poisson (or NB) GLM for the analysis of zero-inflated count data.
- Exercise comparing Tweedie and zero-altered Gamma GLM for the analysis of zero-inflated continuous data.

Wednesday:

- Theory presentation on GAM.
- Exercise on executing (zero-inflated) Poisson and negative binomial GAMs in R-INLA.
- Theory presentation on adding spatial correlation to a regression model in R-INLA.

Thursday:

- Catching up.
- Exercise on adding spatial correlation to a zero-inflated Poisson or negative binomial GAM.
- Exercise on adding spatial correlation to a Tweedie GAM for the analysis of zero-inflated continuous data.
- Theory presentation on adding spatial-temporal correlation to a GLM in R-INLA.

Friday:

- Exercise on adding spatial-temporal correlation to a Poisson or negative binomial GAM.
- Exercise on adding spatial-temporal correlation to a Poisson or negative binomial GAM.
- Time allowing: More exercises.

We reserve the right to change the exercises. Pdf files of all theory material will be provided. All exercises consists of data sets and annotated R scripts. Access to the course website is for 12 months. The Monday-Friday material does not contain on-demand video.

For terms and conditions, see:

<https://www.highstat.com/index.php/component/hikashop/checkout/termsandconditions/step-3/pos-6/tmpl-component>

COURSE TIMES:

- **Monday - Thursday:** 09.00am to 16.30pm including a 1 hour lunch break and a 20 minutes break both morning and afternoon.
- **Friday:** 09.00-13.30. Including a 1/2 hour lunch break and a 20 minutes break in the morning.

GENERAL INFORMATION

COURSE FEE: £500

Credit card payments are charged in GBP currency.

VAT Charge:

- UK participants are charged a 20% VAT.
- Non-EU participants (including Norway and Switzerland) are not subject to VAT.
- We do not 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.
- The course fee does not contain coffee, tea, lunch or accommodation.
- Access to the course website is 12 months.

FREE 1-HOUR FACE-TO-FACE MEETING

The course fee includes a 1-hour face-to-face meeting with one or both instructors. The meeting needs to take place within 12 months after the course. You can discuss your own data, but we strongly advice that the statistical topics are within the content of the course. The 1-hour needs to be consumed in one session, and will take place at a mutual convenient time.

CANCELLATION POLICY:

Once participants are given access to course exercises with R solution codes, pdf files of certain book chapters, and pdf files of presentations, all course fees are non-refundable.

GENERAL

- Please ensure that you have system administration rights to install R, and R packages on your computer.
- Instructions what to install is on the course website.

PRE-REQUIRED KNOWLEDGE

Good knowledge of R, data exploration, linear regression and GLM (Poisson and negative binomial). Short revisions are provided. This is a non-technical course.

RECOMMEND LITERATURE:

- Zuur, Ieno, Saveliev (2017). Beginner's Guide to Spatial, Temporal and Spatial-Temporal Ecological Data Analysis with R-INLA.
- Zuur and Iento (2018). Beginner's Guide to Spatial, Temporal and Spatial-Temporal Ecological Data Analysis with R-INLA. Volume II: GAM and Zero-Inflated Models (2018).
- These books are available from www.highstat.com.
- Books are not included in the course fee. The course can be followed without purchasing these books.

REGISTRATION

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