

Courses 2014-15

February 2-5, 2015, 09:30 -11.30 h

BCAM-Basque Center for Applied Mathematics, Bilbao, Basque Country, Spain www.bcamath.org

Dae-Jin LEE, BCAM

INTRODUCTION TO GENERALIZED LINEAR MODELS WITH R (2ND EDITION)

This is a second edition of the course held in February 2015.

This time an optional pre-course on R basics will be held on Monday 2nd of February from 9:30-11:30.

The Introductory course on GLM's will be from Tuesday to Thursday according to the following dates:

Tuesday (3rd February): 9:30-13:30 (4 hours)

Wednesday (4rd February): 9:30-12:30 (3 hours)

Thursday (5th February): 9:30-12:30 (3 hours)

Registration: Please fill the form to register. (up to 25 participants)

This course is oriented to postgraduate students, researchers and data analysts who need to move beyond standard linear models for modeling data that are not normally distributed. This short course provides an overview of generalized linear models (GLM's) using the R software. GLM's are most commonly used to model binary or count data. These types of data are very common in many research areas such as Biology, Medicine, Engineering, Business, Economics, and many other fields. In this course we will focus on real applications and examples with an emphasis on model validation, estimation and interpretation of the parameters and variable selection and goodness-of-fit.

PREREQUISITES

You must bring your own laptop with R software installed, basic knowledge of R and linear models.

CONTENT

1. Introduction to Generalized Linear Models (GLM's)

- 1.1 Short review of linear regression.
- 1.2 What is a GLM and why to use them?
- 1.3 Components of a GLM

2. Models for binary data

- 2.1 Logistic regression
- 2.2 Estimation and interpretation of the parameters
- 2.3 Some examples

3. Multinomial regression

- 3.1 Function `multinom()` in R
- 3.2 Interpretation of the parameters
- 3.3 Variable selection
- 3.4 Some examples

4. Ordinal regression

- 4.1 Proportional odds model
- 4.2 Function `polr()` in R
- 4.3 Some examples

5. Poisson regression

- 5.1 Poisson distribution
- 5.2 Poisson regression for incidence rates
- 5.3 Some examples