

Advanced Regression Analysis in Natural Sciences with R Software

Workshop leader: Reza.Belaghi@slu.se

This workshop is tailored for participants well versed in regression analysis and seeking to elevate their skills to encompass specialized models. Focusing on **Poisson, Negative Binomial, and Zero-Inflated Regression**, attendees will gain proficiency in modeling count data, handling over-dispersion, and addressing excess zeros. R packages such as `glm.nb` and `'pscl'` will be utilized for Poisson and Negative Binomial regression, while `'pscl'` and `'glmmTMB'` will facilitate Zero-Inflated Regression.

The workshop will extend its scope to include **Cox Regression** (and random effects), an essential survival analysis technique. Participants will explore `'survival'` and `'coxme'` packages in R, delving into time-to-event data and understanding covariate effects on survival outcomes. Through hands-on exercises and real-world examples, this workshop aims to equip attendees with a comprehensive skill set in advanced regression analysis, providing practical insights into modeling techniques for count data, survival analysis, and addressing issues related to excess zeros in the data.

Outlines and structure

The workshop will mainly consist of lectures and discussions, complemented by hands-on practice with R codes. The structure will be as follows:

• Day 1 (23 May, 9:15 am –12 noon)

1. Introduction to Linear Regression
2. Poisson Regression,
3. Negative Binomial Regression
4. Zero-inflated Poisson and Negative Binomial Regression
4. R codes and real examples

• Day 2 (May 24, 9:15am –12 noon)

1. Time to event and censored data analysis
2. Cox Regression
3. Mixed effects cox regression models
4. R codes and real life data analysis

Date and time: 9:15-12 on 23 and 24 of May

Registration is required to participate in the workshop:

<https://docs.google.com/forms/d/e/1FAIpQLSdYHa7PDuPLy0g17ChdYSifSYL8rD04YsAq3I3KNzH8R14A/viewform>

Organizer: Statistics@SLU (<https://www.slu.se/en/centreforstatistics/>)

Location: Ultuna and Zoom

Requirements: Basics in regression analysis and R programming