STA303H1 Methods of Data Analysis II

Patrick Brown

Wednesdays 3-6pm Bahen Centre 1160

- Quercus page: q.utoronto.ca/courses/139220
- Piazza page: TBA
- Instructor's office hour: TBA
- TA office hours: TBA

Course description

The course will focus the using and interpreting advanced statistical methods with applications in a number of different areas. The course is a mixture of theory and applications, and will include a number of assignments which will involve computing with R.

Topics include:

1. Recap of linear models and ANOVA
2. Generalized Linear Models
3. GLM's as Poisson processes
4. Linear mixed effects models
5. Generalized linear mixed models
6. Test 1
7. Longitudinal data analysis and time series
8. Generalized additive models and smoothing
9. GAM's as hierarchical models
10. Test 2
11. Case control studies and conditional likelihood
12. Exam revision

Lecture format

- 2 hours lecture
- 1 hour computer demonstration/lab

Prerequisites

- STA302 is the official prerequisite
- Material from the second year statistical theory courses which are prerequisites to STA302 will be drawn on extensively
- Knowledge of programming with R is essential

Grading

Homework

- 31 Jan: Assignment 1, 5%
- 12 Feb: Test 1, 20%
- 6 March: Assignment 2, 5%
- 18 March: Test 2, 20%
- 27 March: Assignment 3, 5%

Exam

The exam will consist of three questions very similar to the assignments. The exam will be designed to be easy for those who've completed and understood the assignments and extremely difficult for anyone who has not done the assignments themselves.

Practical details

Drop date

15 March

Textbooks

The course will not adhere closely to any single text, though the following will be referred to.

- Maindonald and Braun, *Data Analysis and Graphics Using R: An Example-Based Approach*
- Wakefield, *Bayesian and Frequentist Regression Methods*

Computing

Students will need to have access to a computer running a recent version of R, and several additional packages for R will be installed. Those not familiar with R are encouraged to become so within the first few weeks of the course.

References

Maindonald, J. and W. J. Braun. *Data Analysis and Graphics Using R: An Example-Based Approach*. 3rd ed. Cambridge: Cambridge University Press, May 2010. URL: https://www.cambridge.org/core/books/data-analysis-and-graphics-using-r/E04AEC5BCEF09D2E51A63EB5A8CB0680.

Wakefield, J. *Bayesian and Frequentist Regression Methods*. Springer Series in Statistics. Springer New York, 2013.