

LTCC Advanced Course

Title: Selective Inference

Basic Details:

- Core Audience: 2nd/3rd year, Statistics.
- Course Format: Extended, 5 x 2hr lectures

Course Description:

- Keywords: Variable selection; inference after selection; regression; data splitting; randomisation, condition on selection.
- Syllabus: This course provides an overview of the main approaches to selective inference, where the inferential questions studied are determined by the same data sample as used to perform the inference. Focus of the module is on statistical inference after variable selection in regression. The content is structured as follows:

1. Problem introduction: motivation; definition of appropriate inferential targets post model selection; unconditional versus conditional inferential guarantees.
2. Methods for unconditional selective inference:
 - a) Fixed design regression.
 - b) Random design regression.
3. Methods for conditional selective inference:
 - a) Improving power of conditional inference.
 - b) Information-splitting and randomisation methods.
4. Bayesian approaches to selective inference

- Recommended preliminary reading:
-
- Kuchibhotla, Arun K., Kolassa, John E., and Kuffner, Todd A. (2022). Post-selection Inference. Annual Review of Statistics and Its Application 9, 505-527.

Zhang, Dongliang, Khalili, Abbas and Asgharian, Masoud. (2022). Post-model-selection inference in linear regression models: An integrated review. Statistics Surveys 16, 86-136.

- Prerequisites: Fundamentals of probability and statistical inference.

Format:

- No of discussion/problem sheets: 0. Exercises embedded in course material.
- Electronic lecture notes: Yes

Lecturer Details:

- Lecturer: Professor Alastair Young
- Lecturer home institution: Imperial College London
- Lecturer e-mail: alastair.young@imperial.ac.uk