

ECO2400 Econometrics, Part I

Course Goal: This is the first half of ECO2400 for Fall 2017 (ends on Oct 18). This half covers some basic statistical concepts and discusses some main estimation methods and their theoretical properties. Lectures will be held twice a week on Monday 1-3pm (SS 2127) and Wednesday 2-4pm (SS 2127).

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Office Hours: Monday 3:30 - 5:30pm

TA: Christopher Dobronyi (christopher.dobronyi@mail.utoronto.ca).

Reference: 1. Statistics and Econometric Models (Gourieroux and Monfort [GM], 1995, we will cover Chapter 1-3, 5-7, 8.4 and 9.).
2. Econometric Theory and Methods (Davidson and MacKinnon [DM], 2004)

Course work : This part of the course consists 2 problem sets and 1 midterm exam (November 1st, in class 2 hours closed-book exam).

Course Contents :

1. Introduction ([GM] Ch. 1-2)
 - a) Statistical model, estimator, comparison of estimators
 - b) Review of some useful mathematical statistical tools (distribution, transformation, exponential family, etc)
2. Statistical information ([GM] Ch. 3)
 - a) Sufficiency ([GM] Ch 3.1)
 - b) Information measures (KL distance, Fisher Information) ([GM] Ch 3.3)
3. Unbiased Estimation ([GM] Ch. 5-6, [DM] Ch. 2)
 - a) Desired property: unbiasedness, efficiency ([GM] Ch 5)
 - b) Linear model and best linear unbiased estimator ([GM] Ch 6.1, 6.2, 6.4)
 - c) Finite sample property of least square
 - d) Geometry of Least square ([DM] Ch. 2)
 - e) Large sample property of Least square
4. Maximum likelihood estimation ([GM] Ch. 7, Ch. 8.4, [DM] Ch. 10)
 - a) Maximum likelihood estimator

- b) Finite sample property
 - c) Asymptotic property
 - d) Pseudo MLE
5. Methods of Moment estimation ([GM] Ch. 9, [DM] Ch. 9)
- a) Instrumental variable estimator
 - b) Weak IV inference
 - c) Generalized method of moment estimator
6. Optional [if time permits]
- a) Shrinkage estimator: Ridge, Stein's estimator, LASSO, Pre-testing, Empirical Bayes
 - b) Robustness: quantile regression