

Statistics 721 H(3-0) Theory of Estimation

Calendar Description: Likelihood function and likelihood principle, sufficiency, completeness of exponential families, Cramer-Rao lower bound, Lehmann-Scheffe Theorem, Rao-Blacwell Theorem, estimation methods, basic asymptotic theory, consistent asymptotic normal estimators (CAN), asymptotic properties of the maximum likelihood estimators, Bayesian estimation.

Prerequisites: Statistics [323](#) or Mathematics 323, and Mathematics 353 or [367](#) or [381](#).

(see Course Descriptions under the year applicable: <http://www.ucalgary.ca/pubs/calendar/>)

Syllabus

| <u>Topics</u> | <u>Number of hours</u> |
|---|------------------------|
| Sufficiency and Completeness - Likelihood function and likelihood principle, sufficient and minimal sufficient statistics, completeness of families of distributions, exponential families of distributions, Cramer-Rao lower bound, Lehmann-Scheffe Theorem, Rao-Blacwell Theorem | 10 |
| Methods of Estimation - Moments, least square, maximum likelihood | 4 |
| Basic Asymptotic Theory - Convergence in probability, in mean squared error and in distribution, Slutsky's Theorem | 6 |
| Asymptotic Normal Theory - Consistent asymptotic normal estimators (CAN), asymptotic properties of the maximum likelihood estimators | 6 |
| Bayesian estimation - Prior and posterior distributions, non-informative priors, Jeffreys priors, Bayesian mean squared estimation and absolute error estimation, credible sets and highest posterior density (HPD) sets | 10 |
| TOTAL HOURS | 36 |

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Date: December, 2013

Creator: GC/rs