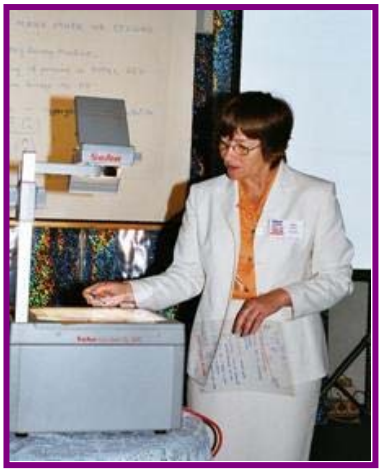
FALL 2007

Department of Mathematics and Statistics

presents



Colloquium
Friday, November 9
2:40 pm in PSA 206
Refreshments in PSA 206 at 3:30 pm

Imbi Traat
University of Tartu

OPTIMAL DOMAIN ESTIMATION UNDER SUMMATION RESTRICTION

The talk is based on the Ph.D. Thesis and on a joint unpublished paper with Kaja Sõstra.

The users of official statistics usually require consistent estimates. In domains' case the simplest requirement is that estimated domain totals sum up to the estimated population total. In fact, this relationship, naturally holding for the true population parameters, is a kind of auxiliary information, which should be incorporated into estimation process with the aim to improve estimates.

Recently, Knottnerus (2003) has proposed a new estimator, called General Restriction (GR) estimator that estimates a parameter vector so that the restrictions are satisfied for the estimates. The new estimator is optimal in the class of all estimators satisfying the same restrictions and using the same initial estimators in its construction.

Sõstra (2003) has developed these ideas for domain estimation under summation restriction. Several good properties are fulfilled for new domain estimators – they satisfy restrictions, they are optimal, they are usually more precise than the initial domain estimators.

In the presentation, the cases with estimated, fixed and conditionally fixed population total are considered. The restricted domain estimators are elaborated for initial ratio estimators. It appears that the covariance structure of domain ratio estimators is simple for some designs (the design-based approach is used). Simple covariance structure of initial estimators simplifies respective restriction estimators, so that they can be easily calculated. In addition to the formulae, illustrative simulation results under two sampling designs are given.

References:

Knottnerus, P. (2003). ***Sample Survey Theory: Some Pythagorean Perspectives.*** **New-York: Springer.**

Sõstra, K. (2007). ***Restriction Estimator for Domains.*** **Ph.D. Thesis, University of Tartu.**

Traat, I., Ilves, M. (2007). The Hypergeometric Sampling design, Theory and Practice. ***Acta Appl Math*** **97(1-3), 311-321.**