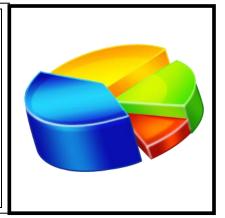# STATISTICS SEMINAR
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Thursday, Sept. 4, 2014
Dickens Hall, Room 207, 4:00-5:00 pm
Refreshments: Dickens 108, 3:30-4:00 pm

Estimation and Testing Using an Outcome-Dependent Enriched Sample

Abstract:

An outcome-dependent enriched (ODE) sample results from combining a random sample with a stratified sample where stratification is based on the levels of the categorical outcome rather than auxiliary information. In biometrics, such a sample can be obtained by combining data from a cohort study with data from an independent case-control study. Here we suppose the probability of the outcome given the predictors is specified up to a set of unknown parameters and assume the marginal distributions of both the outcome and the predictors are unknown. Parameter estimation using the ODE sample can be accomplished via the profile likelihood (PL) method or, alternatively, through the weighted likelihood (WL) method. Asymptotic properties of the WL estimator will be derived and studied. Asymptotic results and simulation demonstrate that the performance of the WL method is often comparable to the asymptotically efficient PL method when the presumed model is correct; however, if the model is misspecified, the WL method is more robust and has a nice interpretation. Families of PL and WL-based tests (likelihood ratio, Wald and score) are also developed for the analysis of an ODE sample and these new tests are shown to have the desired asymptotic type I error and power. Guidelines on the optimal allocation of sample sizes are then provided for the ODE sampling scheme. Results discussed here are based on joint work with Qing Kang from the Statistical Intelligence Group, LLC and Paul I. Nelson from Kansas State University.