Title:
Nonparametric Estimation of Current Status Data with Semi-Competing Risks

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Time & Place:
Wednesday, September 7, 2016, 4:00-5:00pm
Room 331 SMI (Cookies and Coffee @ 3:30 in Rm 1210 MSC)

Abstract:
We consider nonparametric estimation of current status data with semi-competing risks. This type of data often arises in biomedical studies, where the subject is scheduled to be examined for the presence of an asymptomatic non-terminal illness but the process may be curtailed by a terminal event, e.g., death. The fact that the terminal event may occur before the examination and thereby truncates information on the non-terminal event incurs extra identifiability issues compared with right censored data. We show that under this setting, neither the marginal distribution of the non-terminal event nor the sub-distributions are identifiable. Instead, we can only identify the distribution of the composite event, i.e., first occurrence of either event, along with the marginal distribution of the terminal event. We consider two estimators for the identifiable quantities, the maximum likelihood estimator (MLE) and a simpler maximum pseudo-likelihood estimator (MPLE). We cast the problem into the framework of order-restricted optimization, show existence and uniqueness of the estimators, and devise iterative convex minorant (ICM) algorithms for their computation. We prove consistency and convergence rates of $n^{1/3}$ for both estimators. We perform simulation studies to assess and compare the finite sample performances of the proposed estimators.