

## Statistics Seminar

### *Asymptotics of Maximum Partial Likelihood Estimators in General Semiparametric Multiplicative Hazard Models Under First Order Differentiability*

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**Abstract:** In this talk, we discuss the asymptotic properties of a semiparametric multiplicative hazard model when the relative risk is expressed as a first order continuously differentiable parametric function. We show that the log-likelihood function of the model is locally concave for an arbitrary continuously differentiable relative risk under suitable conditions. Then we derive the existence and uniqueness of the MPLE and show consistency. Using the convexity lemma and characterization of minimizers, we demonstrate that the MPLE of the parameter is asymptotically normal. As an application, we exhibit that the MPLE of the parameter in a model in which the log- relative risk is expressed as a free-knot spline with knots in covariates uniquely exists in a neighborhood of the true parameter value and is consistent and asymptotically normal. In particular, we derive the asymptotic normality of the MPLE of the parameter in a model in which the log- relative risk is expressed as a free-knot quadratic spline which has first order continuous derivative.

Wednesday, November 11 at 3:00 PM in SEO 636