

STATISTICS COLLOQUIUM

MONDAY, MAY 09, 2011

TALK: 4:00 PM - SCIENCE CENTER RM. 705

RECEPTION: 5:15 PM - SCIENCE CENTER, 7TH FLOOR

“An Outcome-Free Procedure for Interval Estimation of Causal Effects”

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ABSTRACT

The estimation of population/subpopulation average treatment effects has been a subject of extensive research. In a randomized experiment, common practice entails estimating the average treatment effect by calculating the difference between the average outcome in the treatment group and the average outcome in the control group. In cases where additional covariates that affect the outcome exist, estimation of the treatment effect is typically controlled (adjusted) by using a model that combines the treatment effect and a function of the covariates in an additive manner. This type of model relies on the assumption that the response surfaces from the outcome given the covariates are parallel in the control and treatment groups. When this assumption is incorrect, the estimation of the treatment effect may be unreliable. In observational studies, the effect of this assumption is even more substantial, because the distributions of the covariates in the two groups are usually different.

This talk will focus on the proposal of an outcome-free three-stage procedure based on Rubin's framework for causal inference. First, we create subclasses that include observations from each group based on the covariates. Next, we independently estimate the response surface in each group using flexible spline model. Lastly, multiple imputations of the missing potential outcomes are performed. A simulation analysis which resembles real life situations and compares this procedure to other common methods is carried out. In relation to other methods and in many of the experimental conditions examined, our proposed method is the only one that produced a valid statistical procedure while providing a relatively precise point estimate and a relatively short interval estimate.