
Targeted Maximum Likelihood Estimation (TMLE) and Related Methods

Organizer and Chair: Mireille Schnitzer (McGill University)

SUSAN GRUBER, Harvard School of Public Health
Triple-Robust Targeted Minimum Loss-Based Estimation

An efficient double robust estimator solves the efficient influence curve estimating equation for the parameter of interest. New results show that solving one particular component of the efficient influence curve estimating equation guarantees consistent parameter estimation, even under dual misspecification of the outcome regression and censoring/treatment mechanism models. This result motivates a new triple-robust targeted minimum loss-based estimation (TMLE) procedure that ensures the TMLE solves the required D_{CAR} component of the efficient influence curve estimating equation. Simulation studies demonstrate the consistency properties under correct specification of at least one of the three components of the estimation procedure.

ORI STITELMAN, Media6Degrees
The Challenges of Estimating the Causal Effect of Online Display Advertising

In general the metrics used to evaluate success in online display advertising have nothing to do with measuring effectiveness. However, the effectiveness of the advertising is ultimately what any marketer should care about. There are many challenges associated with estimating the effect of the advertising. Targeted Maximum Likelihood Estimation (TMLE) can address many of these challenges. In this talk we will present an analysis of online display advertising campaigns using TMLE. We will compare and contrast TMLE versus other methods. In addition, we will discuss pragmatic issues regarding estimating causal effects in the online display ecosystem.

MARK VAN DER LAAN, University of California, Berkeley
Targeted Minimum Loss-Based Estimation

I will review Targeted Minimum Loss-Based Estimation (TMLE) that provides a template for the construction of semiparametric efficient substitution estimators of low dimensional estimands in large semiparametric models for which maximum likelihood estimation breaks down due to the curse of dimensionality. We will review various examples, including estimation problems in causal inference. We also review a formal theorem that establish asymptotic normality and efficiency of TMLE, whose condition on the remainder demonstrate that the incorporation of super learning (an ensemble algorithm using cross-validation) is fundamentally important.