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HeiKaMEtrics-Seminar

Joint Heidelberg, Karlsruhe and Mannheim research seminar in Econometrics

Double/De-Biased Machine Learning with Regularized Riesz Representers

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11:15 – 12:15

Room SR C, Mathematikon

Heidelberg University

Abstract:

We provide adaptive inference methods for linear functionals of sparse linear approximations to the conditional expectation function. Examples of such functionals include average derivatives, policy effects, average treatment effects, and many others. The construction relies on building Neyman-orthogonal equations that are approximately invariant to perturbations of the nuisance parameters, including the Riesz representer for the linear functionals. We use l_1 -regularized methods to learn approximations to the regression function and the Riesz representer, and construct the estimator for the linear functionals as the solution to the orthogonal estimating equations. We establish that under weak assumptions the estimator concentrates in a $1/\sqrt{n}$ neighborhood of the target with deviations controlled by the normal laws, and the estimator attains the semi-parametric efficiency bound in many cases. In particular, either the approximation to the regression function or the approximation to the Riesz representer can be “dense” as long as one of them is sufficiently “sparse”. Our main results are non-asymptotic and imply asymptotic uniform validity over large classes of models.

<https://arxiv.org/pdf/1802.08667.pdf>