Seminar

Definition and estimation of a variable importance measure of a continuous exposure

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In [1,2] we defined a new measure of variable importance of an exposure on a continuous outcome, accounting for potential confounders, when the exposure features a reference level x0 with positive mass and a continuum of other levels. We also showed how to build asymptotic confidence intervals for it, using the semi-parametric estimation methodology called targeted minimum loss estimation methodology (TMLE) [3,4,5]. In the application, which motivated the study, the exposure and response are, respectively, the DNA copy number and expression level of a given gene in a cancer cell. The reference level is x0=2, that is the expected DNA copy number in a normal cell. As for the confounder, it is a measure of the methylation of the gene.
This two-part talk will present and discuss the theoretical, computational and applied facets of the study.

[1] Chambaz, Neuvial and van der Laan, Estimation of a non-parametric variable importance measure of a continuous exposure, Electron. J. Stat., 6:1059-1099 (2012)
[2] Chambaz and Neuvial, tmle.npvi: targeted, integrative search of associations between DNA copy number and gene expression, accounting for DNA methylation, Bioinformatics, 31(18):3054-3056 (2015)
[3] van der Laan and Rubin, Targeted maximum likelihood learning, Int. J. Biostat., 2:Article 11 (2006)
[4] van der Laan and Rose, Targeted Learning: Causal Inference for Observational and Experimental Data, Springer Verlag (2011)
[5] van der Laan and Rose, Targeted Learning in Data Science: Causal Inference for Complex Longitudinal Studies, Springer Verlag (2018)

Antoine Chambaz is a Professor at Université Paris Cité, member of the applied mathematics laboratory (MAP5). He is the head of the Statistics group since June 2018, and the director of the FP2M research federation. From 2012 to 2017, he was a member of Modal'X, the stochastic modeling laboratory of Paris Nanterre University. He chaired Modal'X from February 2014 to October 2017. His main research interest is in theoretical, computational and applied statistics.

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This event will be streamed via Webex
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