High Dimensional Nonstationary Time Series

IRTG 1792 Short Course

Alfred Galichon

Optimal Transport with Application to Quantile Regression

In dimension one, the quantile is the inverse of the cumulative distribution function. Quantiles are extremely useful objects because they fully characterize the distribution of an outcome, and they allow to provide directly a number of statistics of interest such as the median, the extremes, the deciles, etc. The classical definition of quantiles based on the cumulative distribution function, however, does not lend itself well to a multivariate extension, and given the number of applications of the notion of quantiles, many authors have suggested various proposals. We have proposed a novel definition of multivariate quantiles called "Vector quantiles" based on optimal transport. The idea is that instead of viewing the quantile map as the inverse of the cumulative distribution function, it is more fruitful to view it as the map that rescales a distribution of interest to the uniform distribution over [0,1] in the least possible distortive way, in the sense that the average squared distance between an outcome and its preimage by the map should be minimized.

Alfred Galichon is a professor of economics (Arts & Science) and of mathematics (Courant Institute) at New York University, an affiliated faculty of NYU's Center for Data Science, and the director of NYU Paris. His research interests span widely across theoretical, computational and empirical questions and include econometrics, microeconomic theory, and data science. He is one of the pioneers of the use of optimal transport theory in econometrics, and the author of a monograph on the topic, Optimal Transport Methods in Economics (Princeton, 2016), as well as of an open-source statistical software implementing these techniques, TraME.

Pr. Galichon holds a Ph.D. in economics from Harvard University, and an engineering degree from Ecole Polytechnique and one from Ecole des Mines de Paris.

November 18, 2020 | 17:00-18:30 | Online via Zoom

November 19, 2020 | 17:00-18:30 | Online via Zoom

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