Mathematics, Statistics, and Computer Science **@ UIC**

Statistics and Data Science Seminar

Functional sufficient dimensions reduction via weak conditional moments

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Abstract: In this talk, a general theory and estimation methods for functional linear sufficient dimension reduction will be presented, where both the predictor and the response can be random functions or even vectors of functions. Unlike the existing dimension reduction methods, our approach does not rely on the estimation of conditional mean and conditional variance. Instead, it is based on a new statistical construction –the weak conditional expectation, which is based on Carleman operators and their inducing functions. Weak conditional expectation is a generalization of conditional expectation. Its key advantage is to replace the projection on to an L2-space – which defines conditional expectation – by projection on to an arbitrary Hilbert space, while still maintaining the unbiasedness of the related dimension reduction methods. This flexibility is particularly important for functional data, because attempting to estimate a full-fledged conditional mean or conditional variance by slicing or smoothing over the space of vector-valued functions may be inefficient due to the curse of dimensionality. We evaluated the performances of our new methods by simulation and in several applied settings.

Wednesday, November 4 at 4:00 PM in Zoom