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

Departmental Colloquium

Wasserstein-Fréchet Regression and Covariance for Samples of Densities

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Abstract: Samples of random densities and other non-Euclidean data are increasingly encountered in data analysis and meaningful notions of mean, regression and covariance for such data are of statistical interest.

This motivates a general class of regression models that relate responses consisting of random objects in a metric space with Euclidean predictors. In extension of the classical concept of Fréchet means (Fréchet 1948), this leads to conditional Fréchet means, which can be estimated with generalized versions of both global least squares and local weighted least squares regression. These approaches will be illustrated for the special case where the random objects are one-dimensional densities and where one chooses the Wasserstein metric on the space of densities. When data consist of vectors of random densities, the notion of Wasserstein covariance,

defined as an expected inner product of optimal transports, can be used to quantify the dependence of the components of these vectors. Applications include data from demography and brain imaging.

Friday, March 22 at 3:00 PM in 636 SEO