



The University of Chicago
Department of Statistics
SUMMER Seminar Series

SUVRIT SRA

Department of Empirical Inference
Max Planck Institute for Biological Cybernetics

Metric Nearness: The Problem, and Recent Advances

MONDAY, August 15, 2011, at 4:00 PM

110 Eckhart Hall, 5734 S. University Avenue

ABSTRACT

I will talk about a simply stated but intriguing problem called "metric nearness". The goal is to minimally modify a set of pairwise dissimilarities to recover a "nearest" set of distances—principally, to satisfy the triangle inequality. I present our formulation of metric nearness as a convex optimization problem, which we solve using triangle-fixing algorithms. I show empirical results indicating that triangle-fixing is computationally superior to general-purpose convex programming software.

Metric data enjoy importance in various applications such as clustering, classification, database search; and metric nearness enjoys connections with several other problems. In particular, I highlight connections to multidimensional scaling, graph clustering, and the well-known All Pairs Shortest Paths (APSP) problem. Curiously, APSP turns out to be a special case of metric nearness, an equivalence which we exploit to obtain a new primal-dual linear-programming algorithm for APSP.

I conclude my talk by presenting updates to what we know about metric nearness beyond our original paper (from 2008)—this includes partial solutions to some of the open problems.

For further information and about building access for persons with disabilities, please contact Laura Rigazzi at 773.702.8333 or send email (lrigazzi@galton.uchicago.edu). If you wish to subscribe to our email list, please visit the following website: <https://lists.uchicago.edu/web/arc/statseminars>.