THE UNIVERSITY OF CHICAGO | DEPARTMENT OF STATISTICS

MASTER'S THESIS PRESENTATION

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Reproducing Kernel Nuclear Space

WEDNESDAY, April 26, 2023, at 2:00 PM
Jones 304, 5747 S. Ellis Avenue

ABSTRACT

We introduce the concept of reproducing kernel nuclear spaces (RKNS), providing a useful tool for gaining insights into learning schemes. By preserving the geometric structure of tensorial data, RKNS generalizes the concept of reproducing kernel Hilbert spaces (RKHS) by utilizing nuclear operators. The properties of general RKNS are studied and examples of reproducing kernels are provided. In particular,
for matrix input, we present results that suggest RKNS theory naturally induces Schatten p-norm for learning problems with regularization, thereby enabling the formulation and solving of machine learning problems that operate over multiple sets. The framework for RKNS learning scheme is developed, and the representer theorem is proven as a linear combination of the reproducing kernels, which are derived from regularized empirical risk minimization problems specified by kernel learning solutions.