Abstracts

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Tensor Data Analysis: Methods, Theories and Applications

In this tutorial, I begin by reviewing the fundamentals of tensor algebra, covering various formats of tensor decomposition and efficient algorithms for obtaining low-rank tensor approximations. Next, I will explore several specific statistical problems, models, and applications such as tensor principal component analysis (PCA), tensor regression, tensor completion, and clustering. Tensor-related problems are challenging, both statistically and computationally. Addressing these challenges requires an interdisciplinary approach that brings together tools and insights from statistics, optimization, and numerical linear algebra, among other fields. I will review the significant progress made in the past decade, including the development of innovative tensor methods inspired by classical statistical principles, the emergence of intriguing statistical theories under computational constraints, and the application of tensor-based techniques in complex network analysis and traditional statistical problems.

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Introduction to Statistical Network Analysis

In this tutorial, we will overview some commonly studied topics, popular models and basic methods in statistical analysis of network data.