

MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

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High-dimensional Multivariate Mediation with Application to Neuroimaging Data

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Refreshments 10:00 am
C405 Wells Hall

Abstract

Mediation analysis is an important tool in the behavioral sciences for investigating the role of intermediate variables that lie in the path between a randomized treatment/exposure and an outcome variable. The influence of the intermediate variable on the outcome is often explored using structural equation models (SEMs), with model coefficients interpreted as possible effects. While there has been significant research on the topic in recent years, little work has been done on mediation analysis when the intermediate variable (mediator) is a high-dimensional vector. In this work we introduce a novel method for mediation analysis in this setting called the directions of mediation (DMs). The DMs represent an orthogonal transformation of the space spanned by the set of mediators, chosen so that the transformed mediators are ranked based upon the proportion of the likelihood of the full SEM that they explain. We provide an estimation algorithm and establish the asymptotic properties of the obtained estimators. We demonstrate the method using a functional magnetic resonance imaging (fMRI) study of thermal pain where we are interested in determining which brain locations mediate the relationship between the application of a thermal stimulus and self-reported pain.

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