The Hong Kong Polytechnic University
Department of Applied Mathematics

Colloquium

Testing mediation effect in high-dimensional compositional microbiome data

By

Prof. Lei Liu

Washington University, U.S.A.

Abstract

Mediation analysis has been commonly used to study the effect of an exposure on an outcome through a mediator. In this paper, we are interested in exploring the mediation mechanism of microbiome. We will tackle two special features complicating the analysis: (1) the relative abundances of the taxa in the microbiome have a compositional feature: each relative abundance is a non-negative value in [0, 1) which adds up to 1; (2) the number of taxa is high dimensional. We propose a novel solution to address these challenges: (1) we consider the isometric log-ratio transformation of the relative abundance as the mediator variable; (2) we develop an estimating and testing procedure for a targeted mediator of interest in the presence of a large number of mediators. Specially, we present a de-biased Lasso estimate and derive its standard error estimator, which can be used to develop a test procedure for the targeted mediation effect. Extensive simulation studies are conducted to assess the performance of our method. We apply the proposed approach to test the mediation effects of human gut microbiome between the dietary fiber intake and body mass index.

Date :   10 December, 2018 (Monday)
Time :   11:00a.m. – 12:00p.m.
Venue : TU801, The Hong Kong Polytechnic University

* * *   ALL ARE WELCOME   * * *