Division of Biostatistics Seminar Series

A Regularization-Based Adaptive Test for High-Dimensional Generalized Linear Models

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Registration Link via Zoom:

https://wustl.zoom.us/meeting/register/tJwtc-CvpjIrGNZZ4YIGQkECAeyh4R12rAgw

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Title: A Regularization-Based Adaptive Test for High-Dimensional Generalized Linear Models

Abstract: In spite of its urgent importance in the era of big data, testing high-dimensional parameters in generalized linear models (GLMs) in the presence of high-dimensional nuisance parameters has been largely under-studied, especially with regard to constructing powerful tests for general (and unknown) alternatives. Most existing tests are powerful only against certain alternatives and may yield incorrect Type I error rates under high-dimensional nuisance parameter situations. In this talk, we will propose the adaptive interaction sum of powered score (aiSPU) test in the framework of penalized regression with a non-convex penalty, called truncated Lasso penalty (TLP), which can maintain correct Type 1 error rates while yielding high statistical power across a wide range of alternatives. To calculate its p-values analytically, we derive its asymptotic null distribution. Via simulations, its superior finite-sample performance is demonstrated over several representative existing methods. In addition, we apply it and other representative tests to an Alzheimer's Disease Neuroimaging Initiative (ADNI) data set, detecting possible gene-gender interactions for Alzheimer's disease.