

# Cramér Moderate Deviations for Studentized Two-Sample $U$ -Statistics with Applications

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## Abstract

**Abstract:** The two-sample  $U$ -statistics are also commonly used to compare the different (treatment) effects of two groups, such as an experimental group and a control group from scientifically controlled experiments. However, due to structural complexities of the two-sample  $U$ -statistics, their theoretical properties are not well studied.

In this talk, we present Cramér type moderate deviation theorems for Studentized two-sample  $U$ -statistics in a general framework, including the two-sample  $t$ -statistic and Studentized Mann-Whitney test statistic as prototypical examples. A refined moderate deviation theorem with second-order accuracy is also established for the two-sample  $t$ -statistic. Moreover, we consider multiple-hypothesis testing based on Studentized two-sample tests, and show how our theoretical results can be applied to these problems. This is a joint work with Qi-Man Shao and Jinyuan Chang.