WICHITA STATE UNIVERSITY
Department of Mathematics, Statistics & Physics

The Lecture Series in the
Mathematical Sciences Presents Our Guest:

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“Development of tools for numerical evaluation of the exact probability distributions with application to selected test statistics in multivariate analysis”

Abstract:
The exact statistical inference frequently leads to non-standard probability distributions of the considered estimators or test statistics, which can be fully specified by their moments or their characteristic functions. The distribution of many estimators and test statistics can be structurally expressed as a linear combination or product of independent random variables with known distributions, which is true for many standard multivariate test criteria.

Typically, such distributions are approximated by standard asymptotic approximations. Small sample approximations are usually based on first moments / cumulants and include, for example, Edgeworth or Gram-Charlier expansions of known distribution. In specific situations, more sophisticated approximations can be used, such as the near-exact distributions proposed by Carlos A. Coelho and his co-authors. However, for a wide class of applications, a method based on numerical inversion of characteristic functions is efficient and fully sufficient.

Here, the applicability of such an approach is illustrated by calculating the exact null and non-null distribution of selected tests in a multivariate statistical analysis. I will point out some practical experiences and problems associated with the calculation of the required characteristic functions and related exact distributions.

Friday, April 23, 2021
3:00 PM via Zoom.

To register for the lecture, please email lecture.series@math.wichita.edu for the link and password.