



The Chinese University of Hong Kong
Department of Statistics

Seminar

Multiple Improvements of Multiple Imputation Likelihood Ratio Tests

By

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Abstract

Multiple imputation (MI) inference handles missing data by first properly imputing the missing values m times, and then combining the m analysis results from applying a complete-data procedure to each of the completed datasets. However, the existing method for combining likelihood ratio tests has multiple defects: (i) the combined test statistic can be negative in practice when the reference null distribution is a standard F distribution; (ii) it is not invariant to re-parametrization; (iii) it fails to ensure monotonic power due to its use of an inconsistent estimator of the fraction of missing information (FMI) under the alternative hypothesis; and (iv) it requires non-trivial access to the likelihood ratio test statistic as a function of estimated parameters instead of datasets. This paper shows, via both theoretical derivations and empirical investigations, that essentially all of these problems can be straightforwardly addressed if we are willing to perform an additional likelihood ratio test by stacking the m completed datasets as one big completed dataset. A particularly intriguing finding is that the FMI itself can be estimated consistently by a likelihood ratio statistic for testing whether the m completed datasets produced by MI can be regarded effectively as samples coming from a common model. Practical guidelines are provided based on an extensive comparison of existing MI tests.

Date: February 1, 2018 (Thursday)
Time: 11:00 a.m. - 12:00 p.m.
Venue: William M W Mong Engineering Building (ERB) - Room 712
The Chinese University of Hong Kong

ALL INTERESTED ARE WELCOME