

G37 – Research Fellows Meeting

Presenter's Abstract

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Higher order criticism of higher criticism

Higher criticism (HC) is a method for comparing a large number of independent P-values to assess whether any are significantly small. It has since been extended and generalised in various directions, including classification and feature selection. The term was originally coined by Tukey and his version of the method was extended by Donoho and Jin in their 2004 *Annals of Statistics* article where they considered a simple normal location mixture model for the P-values and compared local power properties of HC to the corresponding generalised likelihood ratio test (GLRT). They found that in a lower-order sense the two tests are equivalent and further they indicated HC has a certain appeal because it is not “tied” to the parametric model in the way the GLRT is. Our higher-order power analysis reveals that the GLRT has an edge in power over HC (which is perhaps not surprising). We also point out that HC may be viewed as “tied” to a different, simple parametric mixture model.