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A Composite Likelihood Approach Using the Evidential Paradigm to Analyze Genetic Association in Pedigrees

Royall (1997) proposed the evidential paradigm, an alternative to Frequentist and Bayesian paradigms for interpreting data as evidence. The evidential paradigm uses the likelihood ratio (LR) for two simple hypotheses as an objective measure of the strength of statistical evidence. In genetic studies, LRs are commonly used to measure evidence. However, evidential association of pedigrees is not straightforward due to complex family structures. We propose to use composite likelihoods to construct LRs for evidential analysis of families. We show how to make these LRs robust from model misspecification; that they have good operational characteristics; and are consistent with competing methods.