



## Developing near-exact distributions for likelihood ratio statistics to test for Kronecker product structures in covariance matrices

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The authors show how by using an adequate split of null hypotheses of the type  $H_0 : V \otimes \Sigma$ , where  $\Sigma$  is a positive definite matrix which may or not bear some particular structure like circularity or compound symmetry, into a sequence of nested hypotheses which generate conditionally independent tests, it is possible to easily obtain not only the likelihood ratio test statistics as well as to derive the expressions for their moments. The authors also show how this split of the null hypothesis induces on the characteristic function of the logarithm of the statistic a much useful factorization and how this factorization may be used to lay down the basis for the development of very sharp near-exact distributions for the statistic, which enable an easy computation of very sharp near-exact p-values and quantiles.

**Keywords:** asymptotic distributions; hypotheses testing; likelihood ratio tests; mixtures of distributions.