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A novel two-sample test within the space of symmetric positive definite matrix distributions and its application in finance

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Abstract
This paper introduces a novel two-sample test for a broad class of orthogonally invariant positive definite symmetric matrix distributions. Our test is the first of its kind, and we derive its asymptotic distribution. To estimate the test power, we use a warp-speed bootstrap method and consider the most common matrix distributions. We provide several real data examples, including the data for main cryptocurrencies and stock data of major US companies. The real data examples demonstrate the applicability of our test in the context closely related to algorithmic trading. The popularity of matrix distributions in many applications and the need for such a test in the literature are reconciled by our findings.

Keywords Hankel transform · Wishart distribution · Inverse Wishart distribution · Stability of cryptomarkets

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