

# Integral Transform Methods in Goodness-of-Fit Testing for the Wishart Distributions

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## Abstract

In recent years, random data consisting of positive definite (symmetric) matrices have appeared in several areas of applied research such as: diffusion tensor imaging, wireless communication systems, synthetic aperture radar, and models of financial volatility. Given a random sample of positive definite matrices, we develop goodness-of-fit tests for the Wishart distributions. We derive the asymptotic distribution of the test statistic in terms of a certain Gaussian random field, and we obtain an explicit formula for the corresponding covariance operator. The eigenfunctions of the covariance operator are determined explicitly, and the eigenvalues are shown to satisfy certain interlacing properties. As an application, we carry out a test that a financial data set has a Wishart distribution.

*\* This talk is based on work with Elena Hadjicosta (University College London).*

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