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On the product of a singular Wishart matrix and a singular Gaussian vector in high dimension

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Abstract

In this paper we consider the product of a singular Wishart random matrix and a singular normal random vector. A very useful stochastic representation is derived for this product, in using which the characteristic function of the product and its asymptotic distribution under the double asymptotic regime are established. The application of obtained stochastic representation speeds up the simulation studies where the product of a singular Wishart random matrix and a singular normal random vector is present. We further document a good performance of the derived asymptotic distribution within a numerical illustration. Finally, several important properties of the singular Wishart distribution are provided.

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