



## Jean-Marie Beaulieu

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## Fisher Distribution for Texture Modeling of Polarimetric SAR Data

Authors: Bombrun Lionel, Jean-Marie Beaulieu

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**Abstract:** The multilook polarimetric synthetic aperture radar (PolSAR) covariance matrix is generally modeled by a complex Wishart distribution. For textured areas, the product model is used, and the texture component is modeled by a Gamma distribution. In many cases, the assumption of Gamma-distributed texture is not appropriate. The Fisher distribution does not have this limitation and can represent a large set of texture distributions. As an example, we examine its advantage for an urban area. From a Fisher-distributed texture component, we derive the distribution of the complex covariance matrix for multilook PolSAR data. The obtained distribution is expressed in terms of the KummerU confluent hypergeometric function of the second kind. Those distributions are related to the Mellin transform and second-kind statistics (Log-statistics). The new KummerU-based distribution should provide in many cases a better representation of textured areas than the classic K distribution. Finally, we show that the new model can discriminate regions with different texture distribution in a segmentation experiment with synthetic textured PolSAR images.

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