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The Gamma Generalized Normal Distribution: A Descriptor of SAR Imagery

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Abstract

We propose a new four-parameter distribution for modeling synthetic aperture radar (SAR) imagery named the gamma generalized normal (GGN) by combining the gamma and generalized normal distributions. A mathematical characterization of the new distribution is provided by identifying the limiting behavior and by calculating the density and moment expansions. The GGN model performance is evaluated on both synthetic and actual data and, for that, maximum likelihood estimation and random number generation are discussed. The proposed distribution is compared with the beta generalized normal (BGN) distribution, which has already shown to appropriately represent SAR imagery. The performance of these two distributions are measured by means of statistics which provide evidence that the GGN can outperform the BGN distribution in some contexts.

Keywords: Gamma generalized distribution, Generalized normal, Maximum likelihood, Moment, SAR images.

2010 MSC: 62Nxx, 62P30

1. Introduction

The statistics literature is filled with hundreds of continuous univariate distributions and several recent developments focus on new techniques for building

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