

First-Order Separable Spatial Gegenbauer Autoregressive (SSGAR(1,1)) Model

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Abstract

In this paper, we introduce the separable spatial Gegenbauer autoregressive (SSGAR(1,1)) model which is the extension of the First-Order Fractionally Integrated Separable Spatial Autoregressive, FISSAR(1,1) model using the Gegenbauer polynomial. The spectral density and autocovariance functions of the model are introduced and the Whittle's method proposed for estimating the parameters of the model. Finally, Some numerical results are presented. From the numerical results it can be seen that (as Dissanayake, et al. (2018) say), the SSGAR(1,1) model can be used to represent long memory depicting multiple unbounded spectral peaks away from the origin, unlike in the standard long memory ARFIMA case of Hosking (1981), which can only show unbounded spectral density peaks at the zero frequency.

Keywords: Spatial Gegenbauer Autoregressive model, SSGAR(1,1), long memory, FISSAR(1,1) model, Whittle estimation.

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