

ASYMPTOTIC PROPERTIES OF GPH ESTIMATORS OF THE MEMORY  
PARAMETERS OF THE FRACTIONALLY INTEGRATED SEPARABLE  
SPATIAL ARMA (FISSARMA) MODELS

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*Abstract:* In this article, we first extend Theorem 2 of Robinson [11] from one dimension to two dimensions. Then the theoretical asymptotic properties of the means, variances, covariance and MSEs of the regression/GPH (GPH stands for Geweke and Porter-Hudak's) estimators of the memory parameters of the FISSARMA model are established. We also performed simulations to study MSE and covariances for finite sample sizes. We found that through the simulation study the MSE values of the memory parameters tend to the theoretical MSE values as the sample size increases. It is also found that  $m^{1/2}(\hat{d}_1 - d_1)$  and  $m^{1/2}(\hat{d}_2 - d_2)$  are independent and identically distributed as  $N(0, \pi^2/24)$ , when  $m = o(n^{4/5})$  and  $\ln^2 n = o(m)$ .

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