ASYMPTOTIC PROPERTIES OF MAXIMUM-LIKELIHOOD ESTIMATORS OF AUTOREGRESSIVE HILBERTIAN PROCESSES

M.D. Ruiz-Medina and R. Salmerón

The autoregressive Hilbertian time series (ARH(p) series) framework (see Bosq, 2000; Bosq, 2010; Bosq and Blanke, 2007) provides a new perspective for deriving models and tools in the statistical analysis of spatiotemporal data displaying weak-dependence in time (see Salmerón y Ruiz-Medina, 2009). Moment-based parameter estimation has been addressed in Bosq (2000), in terms of the projection into the eigenfunction system of the autocovariance operator. These results are extended to the framework of the projection into a general orthogonal basis in Bosq and Blanke (2007). The maximum-likelihood parameter estimation problem is studied in Ruiz-Medina and Salmerón (2010), in terms of projection into the biorthogonal eigenvector system of the infinite-dimensional parameters involved in the ARH(p) state equation. In this paper, we extend the asymptotic study initiated in Ruiz-Medina and Salmerón (2011) on the large-sample variance properties of these estimators, in terms of the SEM (*Structural Expectation Maximization)* algorithm, to the investigation of their consistency and asymptotic distributional properties.

Key words: ARH(p) processes, Functional limit results, Hilbert-valued processes, Maximum likelihood estimation.

REFERENCES

Bosq, D. (2000). *Linear processes in function spaces*, Springer-Verlag.

Bosq, D. and Blanke, D. (2007). *Inference and Predictions in Large Dimensions*. John Wiley and sons, Paris**.**

Bosq, D. (2010). Tensorial products of functional ARMA processes. *Journal of Multivariate Analysis* **101**, 1352--1363.

Ruiz-Medina, M.D. and Salmerón, R. (2010). Functional maximum llikelihood estimation of ARH(p) models. *Stochastic Environmental Research and Risk Assessment* **24,** 131--146.

Ruiz-Medina, M.D. and Salmerón, R. (2011). Asymptotic properties of functional maximum-likelihood ARH parameter estimators. *Revue des Nouvelles Technologies de l'Information* (n. spécial (S.1) JSFdS Bordeaux, 2009).

Salmerón, R. and Ruiz-Medina, M.D. (2009). Multispectral decomposition of functional autoregressive models. *Stochastic Environmental Research and Risk Assessment* **23**, 289--297.