

The Influence of Covariance Hankel Matrix Dimension on Algorithms for VARMA Models

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Abstract : Some estimation methods for VARMA models, and Multivariate Time Series Models in general, rely on the use of a Hankel matrix. It is known that if the data sample is populous enough and the dimension of the Hankel matrix is unnecessarily large, this may result in an unnecessary number of computations as well as in numerical problems. In this sense, the aim of this paper is two-fold. First, we provide some theoretical results for these matrices which translate into a lower dimension for the matrices normally used in the algorithms. This contribution thus serves to improve those methods from a numerical and, presumably, statistical point of view. Second, we have chosen an estimation algorithm to illustrate in practice our improvements. The results we obtained in a simulation of VARMA models show that an increase in the size of the Hankel matrix beyond the theoretical bound proposed as valid does not necessarily lead to improved practical results. Therefore, for future research, we propose conducting similar studies using any of the linear system estimation methods that depend on Hankel matrices.

Keywords : covariances Hankel matrices, Kronecker indices, system identification, VARMA models

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