Direct Estimation Of ARMA Model Orders Using Output Cumulants

Emara-Shabaik, O.E.; Dept. of Syst. Eng., King Fahd Univ. of Pet. & Miner., Dhahran, Saudi Arabia;

http://www.kfupm.edu.sa

Summary

In this paper, the problem of order estimation of ARMA models is treated using third order cumulants of the observed system output only. It is shown that the rank conditions of certain third order cumulants matrices are directly related to the model orders (p, q). These matrices go from being of full rank to being rank deficient as some of their indices cross the correct model orders. This transition in the rank condition is effectively used to estimate the model orders. This method of order estimation does not relay on the knowledge of the model parameters values which is required in many published methods of order estimation. Moreover, the developed technique is immune against contaminating observations noise effects which usually result in over estimation of model orders. Several numerical examples are provided.

For pre-prints please write to:abstracts@kfupm.edu.sa