

2단계 신경망 구조에 의한 ARMA 모형의 선정

(Two-staged Neural Network Approach for the ARMA Model Identification)

지 원 철* · 이 재 규**

* 홍익대학교 산업공학과

** 한국과학기술원 경영과학과

Abstract: We have attempted, with the aid of resurgent artificial neural network (ANN), to design the system that can help the automatic ARMA model building and forecasting. In this paper, our concern is the ANN-based pattern classification which can resolve the difficulties in the ARMA model identification. To effectively identify the ARMA model, we adopt the Extended Sample Autocorrelation Function (ESACF) as a feature extractor and multi-layered backpropagation network (MLP) as a pattern classifier. After discussing the experimental results from the design of MLP that has two hidden layers, we suggest two-staged neural network approach to effectively classify the noisy ESACF patterns. Noise Filtering Network precedes Pattern Classifying Networks which consist of AR and MA networks. Noise filtering network eliminates noises in patterns and reconstructs patterns which are closest to their ESACF prototypes. Autoassociative approach is used to train this network. Pattern classifying network classifies noise-filtered patterns into appropriate ARMA models. The experiments with the artificially generated test patterns and real time series data show a

promising result. Our approach seems to provide a way to prepare managerial forecasts from ARMA models without human intervention.

Keywords: Artificial Neural Network (ANN), Time Series Modeling, ARMA Model Identification, Extended Sample Autocorrelation Function (ESACF), Pattern Classification, Noise Filtering, Backpropagation Learning Algorithm, Autoassociative approach