



PERFORMANCE OF EXPONENTIALLY WEIGHTED MOVING AVERAGE CONTROL CHART FOR EXPONENTIAL ARIMA PROCESSES

Wannaporn Suriyakat

Faculty of Science and Technology
Pibulsongkram Rajabhat University
Phitsanulok 65000, Thailand
e-mail: suriyakat@psru.ac.th

Abstract

The exponentially weighted moving average (EWMA) control chart has widely used in applications to monitor and improve the quality of manufacturing and service systems. The in-control average run length (ARL_0) and out-of-control average run length (ARL_1) are the traditional measurements of the performance of control chart. In this paper, we study the EWMA control chart when observations are from autoregressive integrated moving average model ($ARIMA(p, d, q)$) with exponential white noise. The objective of this paper is to derive explicit formulas for the in-control average run length and out-of-control average run length on EWMA control chart. Numerical results obtained from explicit formulas and the numerical integration approach by using the Gauss-Legendre quadrature rule are presented. The results show that those approaches are in excellent agreement.

Received: February 21, 2016; Revised: March 20, 2016; Accepted: April 18, 2016

2010 Mathematics Subject Classification: 62-04.

Keywords and phrases: average run length, control chart, exponential distribution, integral equation, time series model.

Communicated by K. K. Azad