## Equal-Weighted Information Criterion for Model Selection in Univariate Time Series Analysis

Sampson Ankrah<sup>\*</sup>, B.L. Peiris<sup>1</sup> and R.O. Thattil<sup>1</sup>

Postgraduate Institute of Agriculture University of Peradeniya, Sri Lanka

**ABSTRACT:** In model building, the model with appropriate number of parameters needs to be identified. Thus, a variety of information criteria have already been developed, each with a different background to handle this challenge. The mostly used information criteria are the Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan and Ouinn Information Criterion (HO). However, available literature and the preliminary analysis done by authors indicated that when selecting the appropriate model, these information criteria usually lacked uniformity. Thus, in this study, an information criterion that serves as a unifier to the three commonly used criteria; AIC, SIC and HO is proposed. The penalties of these three information criteria are considered as a linear function. Simulations were conducted on the performance of the proposed information criterion (PIC) together with the three conventional information criteria using nine models and seven different sample sizes. The results revealed that the proposed information criterion (PIC) performed better than the AIC, SIC and HQ with respect to the overall performance in choosing the true model. The performance of PIC increased as sample size increased. However, PIC turns to underfit, when the true model is not selected. When sample size is large, PIC is asymptotically robust with respect to single processes, Autoregressive (AR) and Moving Average (MA). Thus, the proposed information criterion is recommended when selecting the order of a univariate time series.

Keywords: Information Criteria, Model Selection, Sample size, Robust and Model size.

<sup>&</sup>lt;sup>1</sup> Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka

<sup>\*</sup> Corresponding author: sampson.ankrah@yahoo.com