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**A STUDY ON THE EFFECT OF TEMPORAL VARIATION ON THE
RESPONSE CHARACTERISTICS OF A CATCHMENT**

A THESIS SUBMITTED

BY

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A study of the effect of temporal variation to the response characteristics of a catchment

Abstract

The main objective of this study was to develop a model that could forecast the runoff ratio variation (which was considered as a response characteristic of a catchment) of the Ratnapura catchment of Kalu Ganga basin. Box-Jenkins ARIMA methodology and Kalman filter based on state-space form were used for this purpose. The study also aims to investigate the appropriateness of the developed models for another two catchments (Dela and Ellagawa) of the same river basin. Moreover an investigation has been done to check the long-term variation of runoff ratio with time, in three catchments Ratnapura, Dela and Ellagawa of the Kalu Ganga basin.

Ratnapura catchment has been selected for the study due to various reasons including availability of very high rainfall and frequently reported flood disasters by the sides of Kaluganga. Rainfall data were obtained from Meteorology department and discharge data from Irrigation department for the period of October 1978 to September 1996. These data has been used to calculate runoff ratio.

According to the forecast performance it was clear that the state-space methodology was more accurate than the ARIMA methodology because the MAPE values were relatively small. It was found that the fitted models were well adequate to forecast the runoff ratio data of Dela and Ellagawa catchments too. This research concludes that fitting a model for runoff ratio variation of a catchment of river basin is very important to calculate the runoff of a particular

catchment for a given day. Moreover it was shown that the annual runoff ratio data behaves as random numbers.

As further work, it was suggested to extend the above models of runoff ratio of Ratnapura catchment leading to development of a generalized model for the other catchments of Sri Lanka.

PUBLICATION

1. De Silva, M. A. P (2006), A time series model to predict the runoff ratio of catchments of the *Kalu ganga* basin, Journal of the National Science Foundation of Sri Lanka Volume 34 Number 2.