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KEYWORD : KALMAN FILTER
ATTHANAN LEKUTHAI : APPLICATION OF KALMAN FILTER TECHNIQUE FOR FLOOD FORECASTING AT UBOLRATANA DAM. THESIS ADVISER : SUTAT WEESAKUL,D.Eng. THESIS CO-ADVISER : SEREE CHANYOTHA, Ph.D. 130 pp. ISBN 974-583-102-6

Real time forecasting is the calculation of direct runoff by using the latest data recorded,for example 1 hour or 1 day prior to forecasting. This method of forecasting can provide more accurate result which is very useful for reservoir operation and flood warning.

The objective of this thesis is to apply Kalman Filter Technique to Lump Model which is a Non-Linear Storage Function Model (NLSFM) in order to calibrate and compare the result of direct runoff by using NLSFM alone. Kalman Filter Technique utilizes the current error from NLSFM to improve the parameter of system model so that the next calculation of direct runoff will be more accurate. After calibrating model with 10 year data, it was found that the appropriate initial parameters are the following,Manning Coefficient is equal to 0.030,Initial Error Covariance Matrix is best represented by 0.01% of State Variable Matrix and Initial Model Error Covariance Matrix is used as 0.01% of System Model's Parameters

The application of 8 year actual rainfall data to NLSFM and Kalman Filter Model (KFM) lead to the conclusion that the result of KFM is better than that of NLSFM,the average RMSE are 1.4644 mm and 2.2563 mm,the average errors of peak discharge are 15.70% and 29.05%,the errors of time to peak are 0-1 day and 0-8 day respectively.

The application of 1-2-3 and 4-Day Average forecasted rainfall to NLSFM and KFM yield the same conclusions as the previous case that is average RMSE,the average errors of peak discharge and the errors of time to peak of KFM are better than NLSFM alone.

However,Student t-Test of KFM's and NLSFM's results,using actual rainfall and forecasted rainfall data,prove that they are not significantly different. But there is a tendency in favor of KFM to provide slightly more accurate result.