

Simulation Study of Adjusted Spatial Weighting Method to Estimate Missing Rainfall Data

Muhammad Az-zuhri Azman^{1}, Roslinazairimah Zakaria¹ and Siti Zanariah Satari¹*

1 Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300, Gambang, Kuantan, Pahang, Malaysia

Abstract.

Missing value especially in environmental study is a common problem including in rainfall modelling. Incomplete data will affect the accuracy and efficiency in any modelling process. In this study, simulation method is used to demonstrate the efficiency of the old normal ratio inverse distance correlation weighting method (ONRIDCWM) in solving missing rainfall data. The simulation study is used to identify the best parameters for correlation power of p , percentage of missing value and sample size, n of the ONRIDCWM by simulating for 10,000 times by varying the value of the parameters systematically. The results of the simulation are compared with other available weighting methods. The estimated complete rainfall data of the target station are compared and assessed with the observed data from the neighbouring station using mean, estimated bias (EB) and estimated root mean square error (ERMSE). The results show that ONRIDCWM is better than the other weighting methods for the correlation power of p at least four. For illustration of the weighting method, monthly rainfall data from Pahang has used to demonstrate the efficiency of the method using three error indices: S-Index, mean absolute error (MAE) and correlation, R .

Keywords: Missing Data; Simulation Study; Multiple Imputation; Spatial Imputation; Rainfall Data