

Determination of Distribution Functions Model for Annual Rainfall at Hulu Langat, Selangor, Malaysia

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Abstract. Hulu Langat is a district and parliamentary constituency located between Kuala Lumpur and Putrajaya. Since the study area located near to the urbanization area, the precipitation might be effected by the developing area which required cutting-down forest. Continuously building the new infrastructures and building required statistical analysis to determine the amount of annual precipitation. It is important to design the size of drainage to convey the rainfall to avoid from developing area from flooding. This study was aimed to determine the best model of probability (PDF) and cumulative (CDF) distribution function to be fitted for annual rainfall in study area. Data from station number 3118102, located at Hulu Selangor, Selangor, was chosen to be analyzed. Annual rainfall (mm) was used by adopting six different approaches of distribution function, namely normal (NORM), log-normal with 3-parameter (LN-3), exponential (EXP), gamma with 2-parameter (G-2), log-Pearson with 3-parameter (LP-3) and general extreme value (GEV) distribution function. These models were compared with empirical approach such as method of class interval. Annual rainfall data from 1966 to 2009 (44 years) were used. Missing data were calculated using autoregression moving average (ARMA1). The study were neglected the effects of topography, temperature and land use. The model distribution has been tested using goodness-fit-test such as Chi- and Smirnov-Kolmogorov test to validate the accuracy between model and empirical approach. GEV distribution function was found the best function, PDF and CDF, to be fitted for annual rainfall in study area. It was followed by LN-3 and G-2 that give best fitted to the data. Other approaches, namely EXP, give less than LN-3 and G-2 while LP-3 do not fitted at all for both PDF and CDF. Therefore, it can be conclude that GEV distribution function is the best approach to use in designing rainfall event.

Keywords: Hulu Langat; ARMA1; Method of class interval; PDF; CDF; Goodness-fit-test