

Generating Synthetic Rainfall Total Using Multivariate Skew- t and Checkerboard Copula of Maximum Entropy

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Abstract This study aims to test the appropriateness of multivariate skew- t copula and checkerboard copula of maximum entropy in generating monthly rainfall total data. The generation of synthetic data is important, as it provides hypothetical data in areas for which data availability remains limited. Three selected meteorological stations in Kelantan, Malaysia, Stesen Pertanian Melor, Rumah Pam Salor, and Ladang Lepad Kabu, are considered in this study. Monthly rainfall total data for the driest and wettest months in the year are tested in this study. For these three stations, the identified month with the least total of rainfall received (driest) is May, while the month with the highest total of rainfall received (wettest) is November. The data is fitted to gamma distribution with the corresponding parameters estimated. The observed data will be transformed to be in unit uniform using the gamma marginal. The resulting data is compared to simulated uniform data generated using multivariate skew- t copula and checkerboard copula of maximum entropy models based on the correlation values of the observed and simulated data. Next, the Kolmogorov-Smirnov test is used to assess the fit between the observed and generated data. The results show that the values of simulated correlation coefficients do not differ much for gamma distribution, multivariate skew- t , and maximum entropy approaches. This implies that the multivariate skew- t and maximum entropy may be used to generate monthly rainfall total for cases in which actual data is unavailable.

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