

Working Problems for BSE 5034 Stochastic Hydrology (2017)

WP-8 Stochastic simulation of the bivariate gamma distribution

1. Hourly rainfall data recorded at the Bamboo Lake rainfall station are listed in the file BambooLake_Typhoon_Rainfall.xlsx. Assuming the duration (X) and event-total depth (Y) of typhoons form a bivariate Pearson type III (gamma) distribution. [Note: Set location parameters of the duration and event-total depth as 12 hours and 20 mm, respectively.]
 - (1) Estimate parameters of the bivariate distribution of duration and event-total depth.
 - (2) Generate 1,000 random samples of the bivariate distribution of X and Y , each with sample size $n = 300$, using the frequency-factor based approach. Plot empirical CDF of five samples of the bivariate distribution of X and Y , respectively.
 - (3) From each individual random sample, calculate the sample mean and sample standard deviation of X and Y , and sample correlation coefficient. Construct frequency histograms of these estimators.