

Working Problems for BSE 5034 Stochastic Hydrology (2017)

WP-7 Design Storm Hyetograph

- Hourly rainfall data of seven major storms occurred in a city are given in the EXCEL file `hourly_rainfall_depths.xlsx` (worksheet `AVG_Rank`).
 - Plot dimensionless hyetographs of these storm events using cumulative rainfall percentages.
 - Establish the 24-hour-duration average-rank hyetograph for the city.

- The IDF curves of a city can be expressed by the following equation:

$$i(tr, T) = \frac{330.36 \cdot T^{0.1823}}{tr^{0.438}} \quad (\text{Eq. 1})$$

Units: Intensity: mm/hr Return period: years Duration: minutes
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Calculate the design storm hyetograph for the 24-hour duration and 100-year return period design storm using the alternating block hyetograph model. [Note: Use 1-hour interval for the design storm hyetograph.]

- Hourly rainfall data of 32 *annual maximum events* occurred in a city are listed in the EXCEL file `hourly_rainfall_depths.xlsx` (worksheet `SSGM`).
 - Use the executable code `SSGM_hyetograph.exe` to calculate the SSGM hyetograph of the city. [Note: Use 24 intervals for the SSGM hyetograph.]
 - Suppose IDF curves of the city can be expressed by Eq. 1 in Problem 2. Calculate and plot hourly rainfall depths (in mm) of a design storm with 24-hour duration and 100-year return period.