Stochastic Hydrology 622 U3600

Homework 3-1

1. The probability density and cumulative distribution function of the extreme value type I distribution (also known as the Gumbel distribution) are given as follows.

$$f(x) = \alpha \cdot \exp[-\alpha(x-\beta) - \exp(-\alpha(x-\beta))]$$

$$F_X(x) = \frac{1}{\exp[\exp(-\alpha(x-\beta))]} = \frac{1}{e^{\left[\frac{1}{e^{\alpha(x-\beta)}}\right]}}$$

A 30-year record of annual flood peak water level measured in cm above a certain reference level is given in the following table.

230	282	309	249	348	360	220	295	255	195
288	275	294	245	305	375	287	210	286	500
295	462	400	299	285	330	237	278	307	300

Plot the above data on a probability paper for extreme value type I using the Hazen and Weibull plotting position formula, respectively.

2. The following annual rainfall data in mm were observed at a location. Plot the data on a normal probability paper using the Hazen and Weibull plotting position formula, respectively.

645	718	782	815	877	906	932	945	963	987
1018	1042	1091	1122	1167	1175	1210	1245	1330	