

CEE3430 Engineering Hydrology

Homework 6. Frequency Analysis

Date: 2/22/11

Due: 2/28/11

Objective. After completing this assignment you should be able to:

- Quantitatively describe inherently random quantities using the methods of probability and statistics
- Plot random data using a relative frequency histogram, cumulative frequency histogram and probability plot
- Use the method of moments to fit a probability distribution
- Use frequency analysis to calculate flood flows of a given return period
- Calculate the probability and risk associated with hydrologic events

For all the problems below where the question refers to data from Cypress Creek, please instead use data from the Logan river, USGS station 10109000 for the period 1896 to present. This data is available in the file LoganPeak.txt linked on the class web page (or downloadable from <http://nwis.waterdata.usgs.gov/ut/nwis/>)

1. Bedient 3.1. Use a class interval of 200 cfs.
2. Bedient 3.2
3. Bedient 3.4
4. Bedient 3.5. For (d) find the return period of the 1000-cfs flood
5. Bedient 3.6. For (d) find the return period of the 1000-cfs flood
6. Bedient 3.7
7. Prepare a plot similar to Figure 3-15 that shows the Normal and Log-Normal distributions fit to the Logan River data overlaid with the appropriately scaled relative frequency histogram.
8. Prepare a plot similar to Figure 3-20 that shows the Normal, Log-Normal and Log Pearson 3 distributions in comparison to the Logan River data. Use the methods of Example 3-15 to include 90% confidence intervals for the Log-Normal distribution on your plot.
9. Based on the results from problems 4 to 8 comment on the best estimate and its uncertainty for the 50 and 100 year floods in the Logan River.