It is not likely that graded papers will be returned before the final exam on 8/12. You should make a copy of your work, if desired, for use during the final exam.

We have 2 “leftover” problems from Homework 4 for which we did not cover the relevant material before the assignment due date. Please make sure that you can work the following problems and are prepared to see similar material on the final exam.

- Problem 5.37, pp. 346-347, Wurbs and James.
- Problem 5.57, pp. 353-354, Wurbs and James. Assume the weir length is 100 ft.

Problems 1-7 will be graded on effort alone. You may collaborate freely with others to work these problems.

1. Problem 7.9, p. 456, Wurbs and James. Ignore the statement about Fig. 2.7; it does not help you with the problem. Using the statistical functions in Excel is encouraged for this problem.

2. You are testing the applicability of the NRCS Curve Number method for watersheds in Central Texas. You have gaged 31 watersheds all having the same soil type and general land cover. A storm of 4.35 inches total rainfall has occurred simultaneously on all 31 watersheds, and using streamgage data you have calculated the runoff depth that occurred for each watershed. This data is in the accompanying Excel file.
   a. Using Normal probability paper, verify that the data are normally distributed and determine the mean and standard deviation of runoff for the 31 watersheds. (Hint: Remember that $F(x) = 0.8413$ for $x$ one standard deviation above the mean).
   b. Using Excel, determine the mean and standard deviation of the data and compare to your results from above. Using the NORMDIST function, calculate $f(x)$ and $F(x)$ values for all data points and then plot the PDF and CDF of the data set.
   c. The Curve Number method predicted the runoff for these watersheds would be 3.40 inches from a total rainfall of 4.35 inches. Based upon your analysis above, comment on the accuracy and uncertainty of the CN method for these watersheds. What factors might be used to improve the runoff predictions?
3. Using Eqn. 7.50 and the coefficients in Table 7.6, determine the set of IDF curves for Brazos County for return periods of 2, 5, 10, 25, 50, and 100 years, and storm durations ranging from 5 minutes to 6 hours.


5. Problem 9.8, p. 611, Wurbs and James.


Problems 8-10 will be graded for accuracy. You are to work on these problems individually.

8. A 24 inch diameter well is drilled in a confined aquifer (saturated hydraulic conductivity = 0.70 ft/day, thickness = 350 ft). What well flowrate (cfs) will produce piezometric surface drawdown of 80 ft and a radius of influence of 500 ft?

   (A) 22300
   (B) 0.258
   (C) 0.469
   (D) 14.2

9. Which of the following statements regarding hydrologic frequency analysis are true?

   I. A 25 year flood will only occur once in a 25 year period.
   II. A bridge built for a 50 design life has a 2% probability of experiencing a 50 year flood during that lifespan.
   III. Individual years are treated as being statistically independent.
   IV. Frequency-based design is a technique used because of the uncertainty inherent in hydrologic phenomena.

   (A) I and II only
   (B) II and III only
   (C) III and IV only
   (D) I, II, III, and IV
10. Three monitoring wells have been drilled into an unconfined aquifer. The coordinates and piezometric head at each well are:

Well 1: (2500 m, 1000 m), head = 473.1 m
Well 2: (3500 m, 500 m), head = 492.8 m
Well 3: (500 m, -1200 m), head = 480.9 m

The aquifer’s saturated hydraulic conductivity is 0.17 m/day. The average velocity of flow in this aquifer is:

(A) $6.28 \times 10^{-5}$ m/day
(B) $1.02 \times 10^{-2}$ m/day
(C) $9.63 \times 10^{-4}$ m/day
(D) $3.27 \times 10^{-3}$ m/day