

CVG3120-ASSIGNMENT 5

Due date: Friday, December 9, 23:59

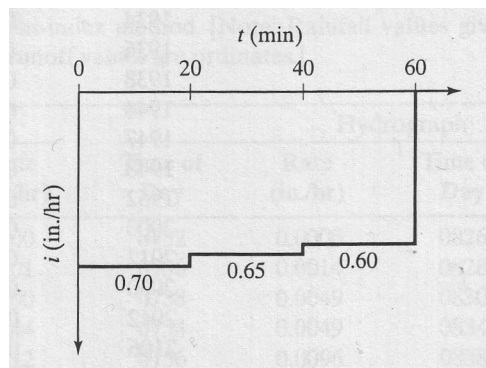
PROBLEM 1

The following data are from the 2.15-acre watershed W-15, Cherokee, Oklahoma, for the storm of November 16, 1964. Assume that baseflow equals 0 and that all rainfall prior to the start of runoff is initial abstraction. Determine the distribution of rainfall excess using the phi-index method. [Note: Rainfall values give the average intensity over the interval; runoff values are ordinates.]

| Time | Rainfall (in/h) | Time | Hydrograph (in/h) | Time | Hydrograph (in/h) |
|------|-----------------|------|-------------------|------|-------------------|
| 0530 | 0.00 | 0732 | 0.0000 | 0826 | 0.5430 |
| 0630 | 0.01 | 0736 | 0.0014 | 0828 | 0.4180 |
| 0730 | 0.00 | 0738 | 0.0049 | 0830 | 0.3220 |
| 0745 | 0.44 | 0754 | 0.0049 | 0834 | 0.2180 |
| 0800 | 0.12 | 0756 | 0.0096 | 0838 | 0.1520 |
| 0805 | 1.92 | 0758 | 0.0228 | 0842 | 0.1040 |
| 0810 | 1.92 | 0800 | 0.0441 | 0900 | 0.0904 |
| 0815 | 1.20 | 0802 | 0.0597 | 0910 | 0.0654 |
| 0820 | 0.72 | 0804 | 0.0972 | 0920 | 0.0490 |
| 0825 | 0.36 | 0806 | 0.1270 | 0930 | 0.0393 |
| 0830 | 0.24 | 0808 | 0.2180 | 0940 | 0.0266 |
| 0845 | 0.12 | 0809 | 0.3350 | 0950 | 0.0155 |
| 0900 | 0.16 | 0810 | 0.4940 | 1000 | 0.0124 |
| 0945 | 0.00 | 0812 | 0.6870 | 1030 | 0.0124 |
| 0950 | 0.24 | 0814 | 0.8070 | 1056 | 0.0096 |
| 1000 | 0.00 | 0816 | 0.9370 | 1110 | 0.0049 |
| 1015 | 0.16 | 0817 | 1.0500 | 1130 | 0.0049 |
| 1035 | 0.03 | 0820 | 0.8710 | 1220 | 0.0014 |
| | | 0824 | 0.6680 | 1350 | 0.0000 |

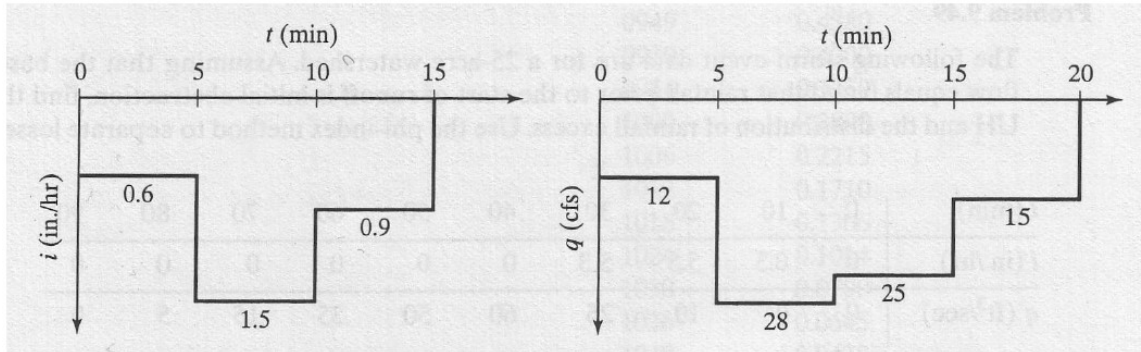
PROBLEM 2

If $f_0 = 0.65$ in./hr, $f_c = 0.25$ in./hr, and $K = 0.35$ hr⁻¹, determine the distribution of losses and the depth of rainfall excess for the following hyetograph:



PROBLEM 3

Compute the DRH resulting from the hyetograph (figure at the left) given the unit hydrograph given at the right.



PROBLEM 4

A 2-hour unit hydrograph is given by a triangle whose base is 4 hours and height at the midpoint of the base is 0.5/hour. Compute the direct runoff due to a 4-hour effective rainfall whose intensity is 2 cm/h. compute the peak discharge. Derive a 3-hour unit hydrograph. If a 3-hour effective rainfall occurs at a uniform rate of 1 cm/h, what should be the direct runoff?. Give its peak discharge.