

Name: _____

Problem Set 2
ERS 420

Purpose

Flow from springs typically peaks in early spring (at least in places where it snows), when the amount of water stored in a watershed is at its maximum, and decreases throughout the spring and summer. Assuming the spring could flow forever based on the following relationship:

$$\sum_{t=0}^{\infty} K \frac{1}{2^t} = Q \quad (1)$$

Where each term in the infinite series is the amount of water that flows from the spring each day (Q [$\frac{m^3}{day}$]), on day 't' after peak flow (K). Note that K is the product of the initial amount of water and a constant. Water released over each day is half the amount that flowed from the spring during the previous day. Summing these amounts should indicate the total amount of water that could be discharged by the spring.

Problems

1. Create a program that estimates the amount of water initially supplying water to a spring. Discharge from the spring is initially 100 liter over the first day, etc. On what day will the discharge first drop below a milliliter per day?
2. Assume that it rains, on average, every 10 days adding 10 liters during each of these vents to the reservoir that supplies the spring. Assume that flow from the spring is proportional to the amount of water in the reservoir. Create a new program that accounts for this additional complexity. On what day will the discharge now first drop below a milliliter per day?

Expectation

1. Explain the methodology you used to solve these problems.
2. Include a copy of your computer scripts (should be two separate scripts), commented so that anyone could easily determine what is being done.
3. Provide answers and explanations to the questions above.