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Runoff Flow and Peak Algorithm Formulas

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List of 13 Runoff Flow and Peak Algorithm Formulas

Runoff Flow and Peak Algorithm

Flow-Duration Curve

1) Number of Data Points given Percentage Probability of Flow Magnitude

Open Calculator

fx $$N = \left(m \cdot \frac{100}{P_p}\right) - 1$$

ex $$26.02703 = \left(4 \cdot \frac{100}{14.8}\right) - 1$$

2) Order Number of Discharge given Percentage Probability of Flow Magnitude

Open Calculator

fx $$m = P_p \cdot \frac{N + 1}{100}$$

ex $$3.996 = 14.8 \cdot \frac{26 + 1}{100}$$

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3) Percentage Probability of Flow Magnitude

Open Calculator

fx $$P_p = \left(\frac{m}{N+1} \right) \cdot 100$$

ex $$14.81481 = \left(\frac{4}{26+1} \right) \cdot 100$$

Natural Flow

4) Change in Storage Volumes

Open Calculator

fx $$\Delta Sv = R_N - R_o + V_r - V_d - E_M - F_x$$

ex $$20 = 174 m^3/s - 50 m^3/s + 10 m^3/s - 12 m^3/s - 2 - 100$$

5) Natural Flow Volume

Open Calculator

fx $$R_N = (R_o - V_r) + V_d + E_M + F_x + \Delta Sv$$

ex $$174 m^3/s = (50 m^3/s - 10 m^3/s) + 12 m^3/s + 2 + 100 + 20$$

6) Net Evaporation Losses from Reservoir on Stream

Open Calculator

fx $$E_M = R_N - R_o + V_r - V_d - F_x - \Delta Sv$$

ex $$2 = 174 m^3/s - 50 m^3/s + 10 m^3/s - 12 m^3/s - 100 - 20$$

7) Net Export of Water from Basin

Open Calculator

$$F_x = R_N - R_o + V_r - V_d - E_M + \Delta Sv$$

$$140 = 174\text{m}^3/\text{s} - 50\text{m}^3/\text{s} + 10\text{m}^3/\text{s} - 12\text{m}^3/\text{s} - 2 + 20$$

8) Observed Flow Volume at Terminal Site given Natural Flow Volume

Open Calculator

$$R_o = R_N + V_r - V_d - E_M - F_x - \Delta Sv$$

$$50\text{m}^3/\text{s} = 174\text{m}^3/\text{s} + 10\text{m}^3/\text{s} - 12\text{m}^3/\text{s} - 2 - 100 - 20$$

9) Volume Diverted Out of Stream

Open Calculator

$$V_d = R_N - R_o + V_r - E_M - F_x - \Delta Sv$$

$$12\text{m}^3/\text{s} = 174\text{m}^3/\text{s} - 50\text{m}^3/\text{s} + 10\text{m}^3/\text{s} - 2 - 100 - 20$$

10) Volume of Return Flow

Open Calculator

$$V_r = -R_N + R_o + V_d + E_M + F_x + \Delta Sv$$

$$10\text{m}^3/\text{s} = -174\text{m}^3/\text{s} + 50\text{m}^3/\text{s} + 12\text{m}^3/\text{s} + 2 + 100 + 20$$

Sequent Peak Algorithm

11) Inflow Volume given Net Flow Volume

Open Calculator

$$x_i = V_f + D_i$$

$$15.1\text{m}^3/\text{s} = 10.1\text{m}^3/\text{s} + 5\text{m}^3/\text{s}$$

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12) Net Flow Volume

Open Calculator

fx $V_f = x_i - D_i$

ex $10\text{m}^3/\text{s} = 15\text{m}^3/\text{s} - 5\text{m}^3/\text{s}$

13) Outflow Volume given Net Flow Volume

Open Calculator

fx $D_i = x_i - V_f$

ex $4.9\text{m}^3/\text{s} = 15\text{m}^3/\text{s} - 10.1\text{m}^3/\text{s}$

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Variables Used

- D_i Outflow Volume *(Cubic Meter per Second)*
- E_M Net Evaporation Losses
- F_x Net Export of Water from Basin
- m Order Number of Discharge
- N Number of Data Points
- P_p Percentage Probability
- R_N Natural Flow Volume *(Cubic Meter per Second)*
- R_o Observed Flow Volume *(Cubic Meter per Second)*
- V_d Volume Diverted Out of Stream *(Cubic Meter per Second)*
- V_f Net Flow Volume *(Cubic Meter per Second)*
- V_r Volume of Return Flow *(Cubic Meter per Second)*
- x_i Inflow Volume *(Cubic Meter per Second)*
- ΔSv Change in Storage Volumes

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Constants, Functions, Measurements used

- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m³/s)
  Volumetric Flow Rate Unit Conversion

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Check other formula lists

- **Runoff Density and Form Factor Formulas**
- **Runoff Flow and Peak Algorithm Formulas**

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