

APPENDIX-V

DEVELOPMENT OF ROUTING EQUATIONS FOR CLARK MODEL

Clark (1945) was the first to show that the routing of a flood wave in a reach could be successfully accomplished by translating the wave into a time equal to the travel of the reach and then routing in through an amount of reservoir, storage equivalent to that in the reach. From this, Clark conceived that this approach could be used to derive the IUH for a basin by routing the time area curve of a basin through a given amount of linear reservoir storage hypothetically, this simply infers placing a reservoir at the outlet of a stream that has storage characteristics such that $S=RO$. Hence the continuity equation for linear storage is

$$\frac{I_1 + I_2}{2} - \frac{O_1 + O_2}{2} = \frac{R(O_2 - O_1)}{\Delta t} \quad (V.1)$$

$$O_2 = \frac{0.5 \Delta t}{R + 0.5 \Delta t} I_2 + \frac{0.5 \Delta t}{R + 0.5 \Delta t} I_1 + \frac{R - 0.5 \Delta t}{R + 0.5 \Delta t} O_1 \quad (V.2)$$

For practical purposes $I_1 = I_2$

$$O_1 = \frac{\Delta t}{R + 0.5 \Delta t} I_1 + \frac{R - 0.5 \Delta t}{R + 0.5 \Delta t} O_1 \quad (V.3)$$

$$O_2 = C I_1 + (1 - C) O_1 \quad (V.4)$$

$$\text{where } C = \frac{\Delta t}{R + 0.5 \Delta t} \quad (V.5)$$

