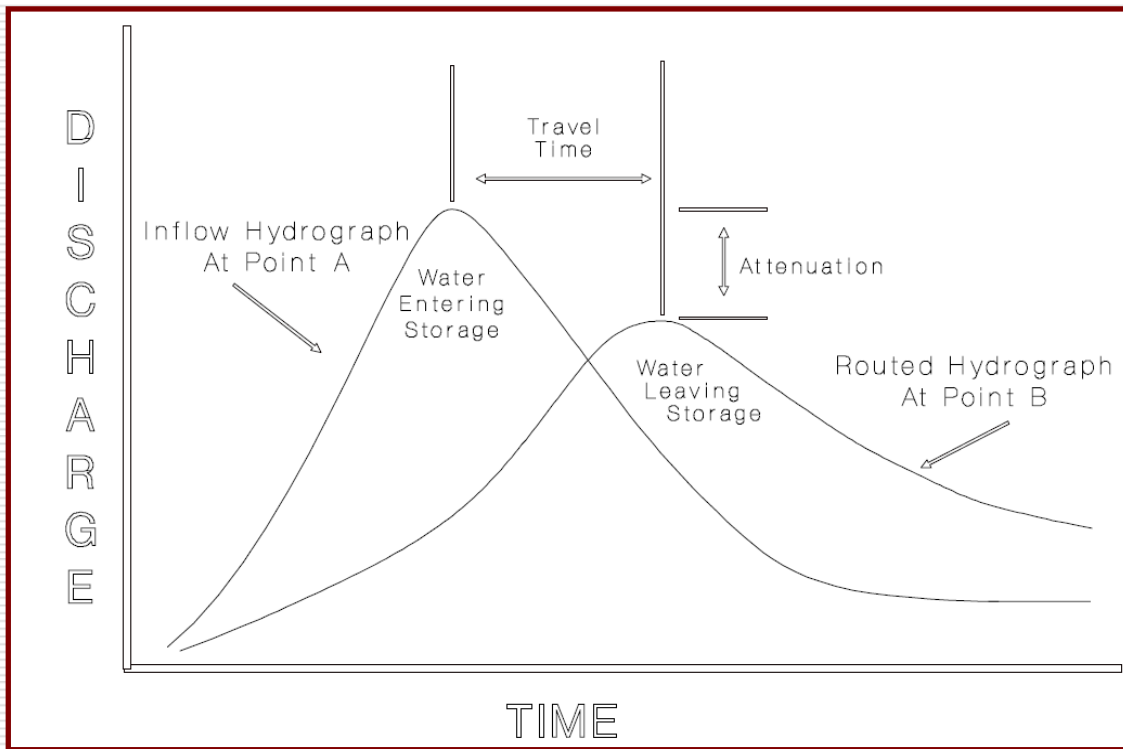


Routing

Routing is a process used to predict the Temporal and Spatial variations of a flood hydrograph as it moves through a river reach or reservoir

Why needed?



To Determine

- Travel Time from the point of observation to point of calculation
- Attenuation in peak

Known

- Inflow Hydrograph

Unknown

- Outflow Hydrograph

Types

□ Hydraulic Routing

- Based on the solution of the partial differential equations of unsteady open channel flow. (Often the St. Venant equations)

□ Hydrologic Routing

- The continuity equation and an analytical or an empirical relationship between storage within the reach and discharge at the outlet are analyzed.
-

Hydrologic Routing

- Generally, for watershed simulation studies hydrologic routing is used
- Is used to obtain a discharge hydrograph at a point downstream from a location where a hydrograph has been observed or computed

Equation used is
$$I - O = \frac{\Delta S}{\Delta t}$$

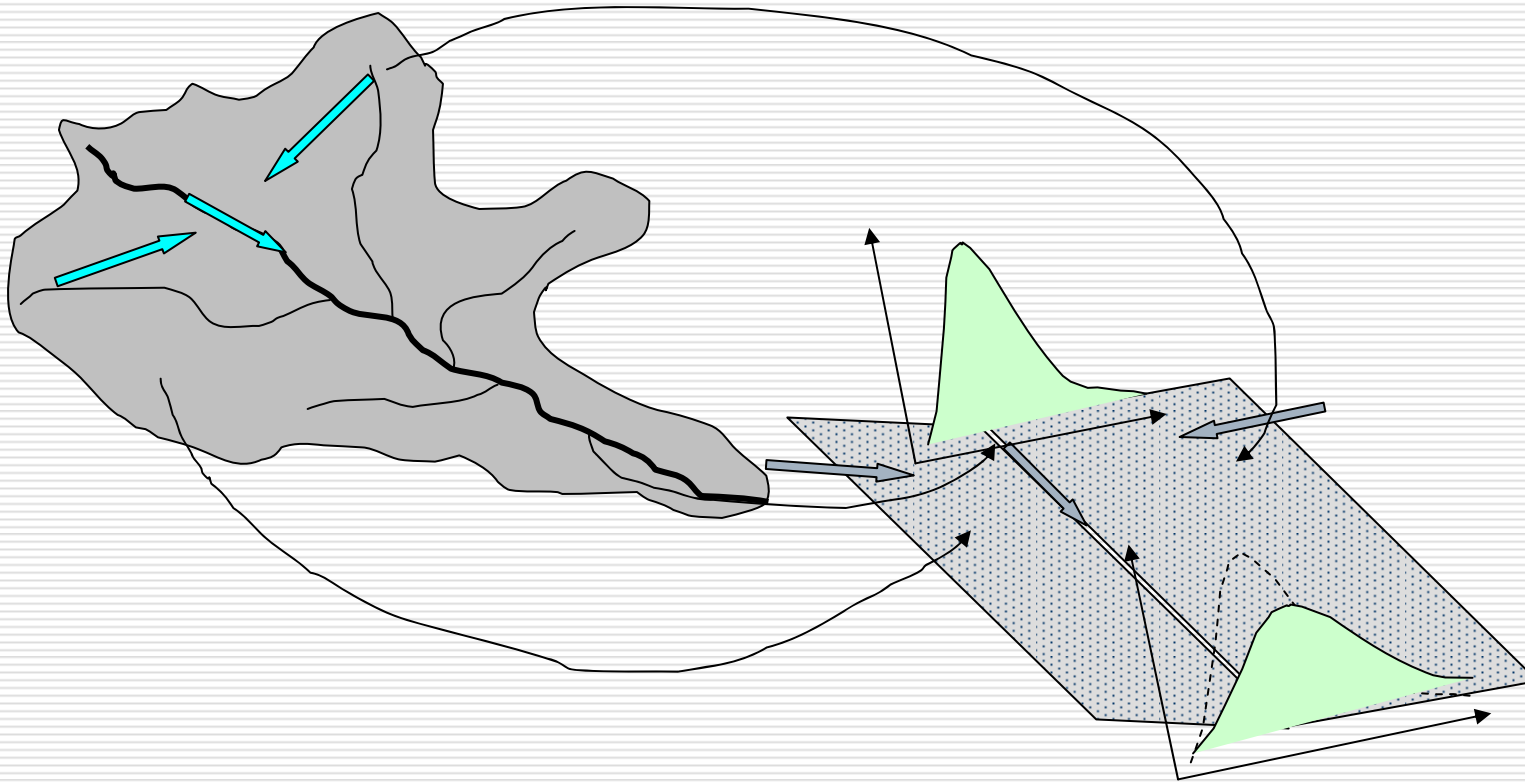
Where

I = the average inflow to the reach
during Δt

O = the average outflow from the reach
during Δt

S = storage within the reach

Channel Routing



The hydrograph is routed along the river resulting in Attenuation of peak and translation

Hydrologic Routing

- ❑ Modified Plus Reservoir Routing
- ❑ Modified Plus Channel Routing
- ❑ Muskingum Method
- ❑ Muskingum-Cunge Channel Routing

- ❑ For further Reading Refer chapter 9 of EM 1110-2-1417
<http://www.usace.army.mil/publications/eng-manuals/em1110-2-1417/c-9.pdf>
-

Routing in HEC-HMS

Reach Routing

- Kinematic Wave
- Lag
- Modified Plus
- Muskingum
- Muskingum-Cunge
- Straddle Stagger

Reservoir Routing

- Outflow Curve
 - Outflow Structures
 - Specified Release
-

Demonstration

