Lesson 25: Hydrologic Routing
Muskingum Method

Muskingum Flood Routing Example

For the inflow hydrograph shown below, perform the routing through the reservoir reach assuming K = 20 hours and X = 0.25.

Δt = 12 hours

$$C_1 = \frac{\Delta t - 2KX}{2K(1-X) + \Delta t} = \frac{12 - 2(20)(0.25)}{2(20)(1-0.25) + 12} = 0.0476$$

$$C_2 = \frac{\Delta t + 2KX}{2K(1-X) + \Delta t} = \frac{12 + 2(20)(0.25)}{2(20)(1-0.25) + 12} = 0.5238$$

$$C_3 = \frac{2(20)(1-0.25) - 12}{2(20)(1-0.25) + 12} = 0.4286$$

Check: $C_1 + C_2 + C_3 =$ 0.0476 + 0.5238 + 0.4286 = 1

	Inflow	0.0476	0.5238	0.4286	**Outflow**
Time	**I**	$C_1\ I_{j+1}$	$C_2\ I_j$	$C_3\ Q_j$	Q_{j+1}
(h)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
12	100	---	---	---	100.0
24	300	14.3	52.4	42.9	109.5
36	680	32.4	157.1	46.9	236.5
48	500	23.8	356.2	101.3	481.3
60	400	19.0	261.9	206.3	487.2
72	310	14.8	209.5	208.8	433.1
84	230	11.0	162.4	185.6	358.9
96	180	8.6	120.5	153.8	282.9
108	100	4.8	94.3	121.2	220.3
120	50	2.4	52.4	94.4	149.2