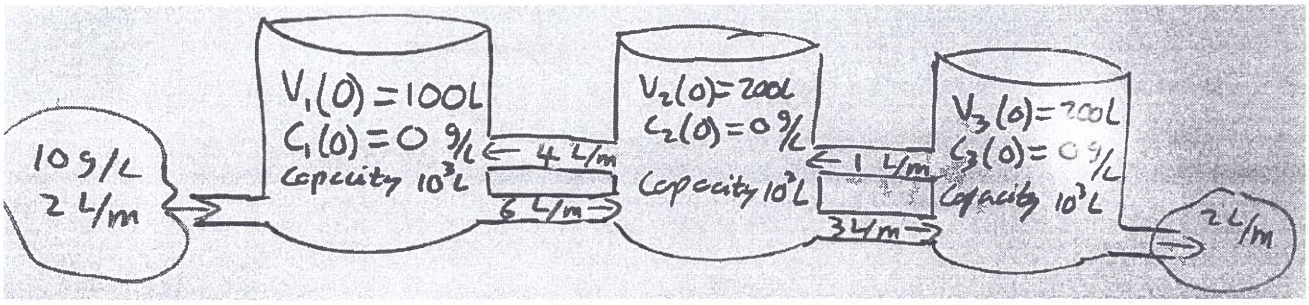
Wed

Name	M #

S --- salt in g
C --- conc
V --- volume



Write down the ODE for the tank system.

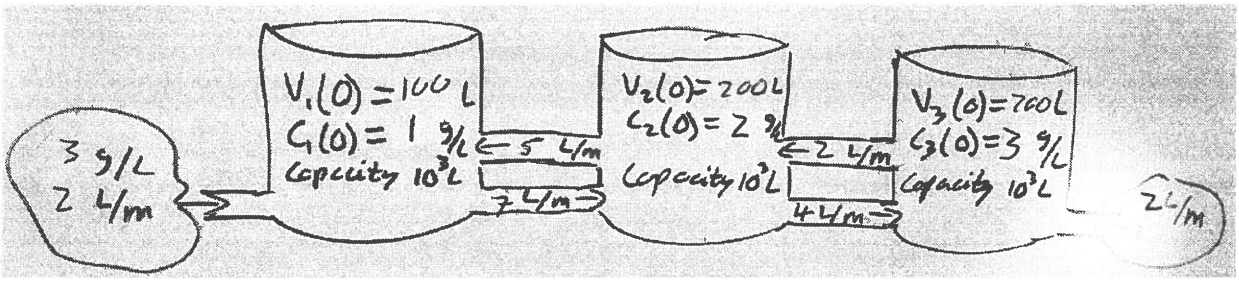
Check Vol In = Vol out

$V_1(t) = 100$
$V_2(t) = 200$
$V_3(t) = 200$

$C_1 = S_1/100$
$C_2 = S_2/200$
$C_3 = S_3/200$

$$S_1' = 10(2) - 6C_1 + 4C_2$$
$$S_2' = 0 + 6C_1 - (4+3)C_2 + 1C_3$$
$$S_3' = 0 + 0C_1 + 3C_2 - 2C_3$$

$$S' = \begin{bmatrix} -6/100 & 4/200 & 0 \\ 6/100 & -7/200 & 1/200 \\ 0 & 3/200 & -2/200 \end{bmatrix} \begin{bmatrix} S_1 \\ S_2 \\ S_3 \end{bmatrix} + \begin{bmatrix} 20 \\ 0 \\ 0 \end{bmatrix}$$



1) Write down the ODE for the tanks system in matrix for $y' = A.y + f$ and $y(0) = y_0$

$$A = \begin{pmatrix} & & \\ & & \\ & & \end{pmatrix}, f = \begin{pmatrix} \\ \\ \end{pmatrix}, \text{and } y_0 = \begin{pmatrix} \\ \\ \end{pmatrix}$$