

# Concentration Problems

$x(t)$  = amount of substance present at time  $t$

$x'(t)$  = rate of change in amount of substance present at time  $t$

$F_i(t)$  = flow **rate** into the container at time  $t$ .  $unit = \frac{volume}{t}$

$F_o(t)$  = flow **rate** out of the container at time  $t$ .  $unit = \frac{volume}{t}$

$C_i(t)$  = input concentration at time  $t$ .  $unit = \frac{amount}{volume}$

$V(t) = V_0 + \int_0^t F_i(s) ds - \int_0^t F_o(s) ds$  volume of **total** solution at time  $t$ .

$\frac{x(t)}{V(t)}$  = output concentration at time  $t$ .  $unit = \frac{amount}{volume}$

