$$A \xrightarrow{k} B$$

B

$$\frac{dC_A}{dt} = -k C_A \qquad \frac{dC_B}{dt} = k C_A$$

$$C_A[0] = C_{A0} = 10 \ \frac{mol}{L}$$

$$k = 0.001 \ \frac{L}{m \cdot s}$$

$$2A \rightarrow B$$ → if you have fin. P1.

C_list

C_A	C_B

Batch

$$\begin{cases} A + B \xrightarrow{k_1 = 1} C \\ B + C \xrightarrow{k_2 = 1.1} D \end{cases}$$

mol/L

$C_{A_0} = 1$

$C_{B_0} = 1$

$C_{C_0} = 0$

$C_{D_0} = 0$

1) $C_i(t)$

2) Selectivity (c)

$$S = \frac{[C]}{[C]+[D]}; \quad S(0) = 1.$$

$$\frac{dC_A}{dt} = -k C_A C_B \quad r_1$$

$$\frac{dC_B}{dt} = -k_1 C_A C_B - k_2 C_C C_B \quad r_2$$

$$\frac{dC_C}{dt} = k_1 C_A C_B - k_2 C_B C_C$$

$$\frac{dC_D}{dt} = k_2 C_B C_C$$

$$\boxed{\begin{aligned} dC_A/dt &= -r_1 \\ dC_B/dt &= -r_1 - r_2 \\ dC_C/dt &= r_1 - r_2 \\ dC_D/dt &= r_2 \end{aligned}}$$

time_start = 0

finish = 3.

L

Z

$L + Z$

$-k(t)[z]$

Z

R

$L \xrightarrow{d} R$

$\cancel{R} \rightarrow Z$

S - Living - Susceptible

Z - Zombie

R - removed (dead)

P - population birth rate

d - death prob. $S \to R$

B → chance S → infected → Z

G → Zombie $R \to Z$ resurrect

A → $S + Z \to R + S$ human killing zombie

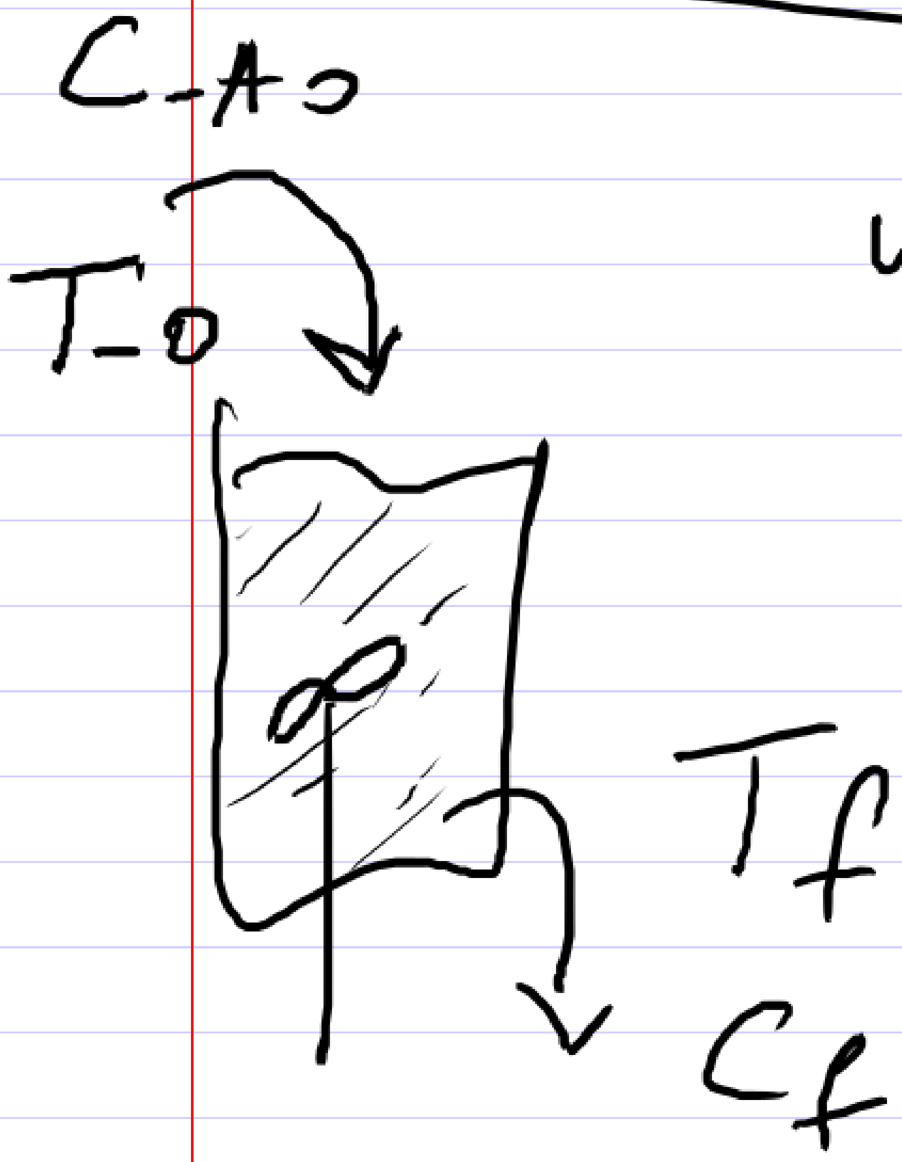
$-K[S][Z]$

$$\frac{dS}{dt} = P - d \cdot S - B \cdot S \cdot Z$$

$$\frac{dZ}{dt} = B \cdot S Z + G \cdot R - A \cdot S \cdot Z$$

$$\frac{dR}{dt} = d \cdot S + A \cdot S \cdot Z - G \cdot R$$

Tank mixer.



We want to know
$C(t)$
$T(t)$

Energy balance: $\dot{Q} = 0$

$$m\left(C_p \frac{dT}{dt}\right) = \dot{m}_{in} C_p (T_{in} - T_{ref}) + \dot{m}_{out} C_p (T_{out} - T_{ref}) + \dot{Q} + \dot{W}$$

$\Delta \dot{n}$

$m = \rho V$

$\dot{m} = \dot{V} \rho$, $\dot{V} = q$

$$\cancel{\rho} V \cancel{C_p} \frac{dT}{dt} = \cancel{\rho} \dot{V} \cancel{C_p} (T_{out} - T_{in})$$

$$V \frac{dT}{dt} = \dot{V} (T_{out} - T_{in}), \quad \dot{V} = q$$

1) $$\frac{dT}{dt} = \frac{q}{V} (T_{out} - T_{in})$$

$$\frac{dT}{dt} = \frac{q}{V} (T_f - T(t))$$

mass balance C

$$V\frac{dC}{dt} = q(C_f - C_{in})$$

$$V\frac{dC}{dt} = q\left(C_f - C(t)\right)$$