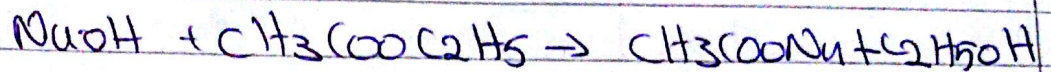


Continuous Stirred Tank Reactor

objectives:

determine the kinetics of saponification reaction and measure residence time density $\Rightarrow$ (E curve)

Reaction:



rate: $-r_A = k \cdot C_A^\alpha C_B^\beta$

Part A = 1: assuming B in excess.

$$-r_A = k' C_A^\alpha \rightarrow (\text{linearize.})$$

$$\ln -r_A = \ln k' + \alpha \ln C_A \rightarrow p$$

plot $\ln(-r_A)$ vs. $\ln C_A$

$$\text{slope} = \alpha$$

$$-r_{\text{NaOH}} = \frac{\text{flow in} - \text{flow out}}{V(\text{rct})} \quad \text{mol/s}$$

Flow in $\Rightarrow$ ~~moles A~~ $(C_{\text{in}} A) (\dot{V}_{A \text{ in}})$
~~volume flow rate~~

Flow out $\rightarrow (C_{A \text{ out}}) (\dot{V}_{A \text{ out}} + \dot{V}_{B \text{ out}})$
calculate the rest:

time density function: $E(t)$.

$E(t) =$ $\frac{(C(t)) \cdot \theta}{\int C(t) dt}$ $\leftarrow$ changing with time

$\leftarrow$ constant from integration
 $\leftarrow$ you can give trapezoidal