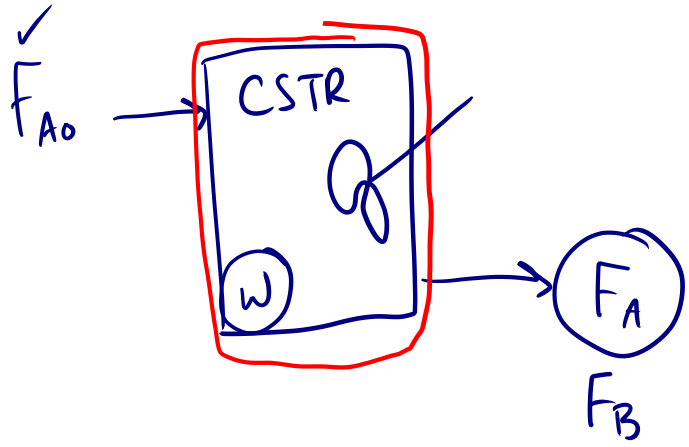


$$A_{(g)} \longrightarrow B_{(g)}$$

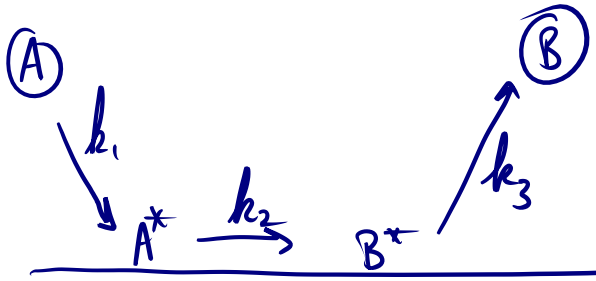
$$\frac{dN_A}{dt} = 0 = F_{A0} - F_A - W r_A = W = \frac{F_{A0} - F_A}{-r_A|_{ex.t}}$$

$\frac{mol}{s}$ $\frac{mol}{s}$ k_g $\frac{mol}{kg \cdot s}$

$$r = \frac{A P_A}{B + (C P_A + D P_A)}$$

$$r = \frac{k_1 k_2 k_3 P_A}{k_2 k_3 + k_1 k_3 P_A + k_1 k_2 P_A} \Rightarrow \frac{\frac{1}{s^3}}{\frac{1}{s^2}} \Rightarrow \frac{1}{s}$$

$$-r_A = k_{app} P_A$$



$$k_2 = \frac{1}{s}$$

$$\frac{d\theta_A}{dt} = k_1 P_A (1 - \theta_A - \theta_B) - k_2 \theta_A$$

$\frac{1}{s}$

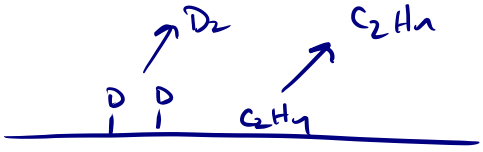
$k_1 P_A \Rightarrow \frac{1}{s}$

$$k_1 = \frac{1}{P \cdot s}$$

$$\frac{d\theta_B}{dt} = k_2 \theta_A - k_3 \theta_B$$

$$k_3 \Rightarrow \frac{1}{s}$$

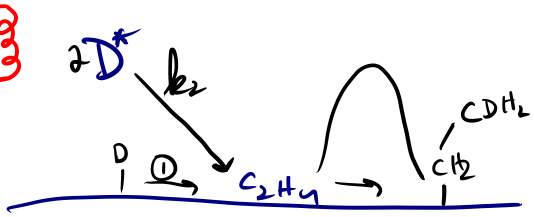
$D_2 + C_2H_4$



no rxn

$D_2 \rightarrow$ 2D*

C_2H_4



$$k = k_0 e^{-E_1/k(T_s)^{-\hbar\omega}}$$

$$k_2 = k_0 e^{-E_1/kT^*}$$

For dimensional consistency:

$$r \cdot \frac{\text{mol sites}}{\text{kg cat}} \Rightarrow \frac{\text{mol}}{s \cdot \text{kg}}$$

$$\frac{r_A}{-1} = \frac{r_B}{1} = r$$

$$\frac{\#\ \text{sites}}{cm^2}$$

$$\frac{10^{13} - 10^{15}\ \text{sites}}{cm^2} \cdot \frac{1}{N_A} \cdot \left(\frac{SA}{\frac{m^2}{gm}}\right) \Rightarrow \frac{\text{mol sites}}{\text{gm cat}}$$

$$r = \frac{A P_A}{B + C P_A}$$

$$= \frac{A' P_A}{1 + C' P_A}$$

$$A' = \frac{A}{B}$$

$$C' = \frac{C}{B}$$

$$\frac{A}{B} P_A \Rightarrow \frac{1}{s}$$

$$\frac{A}{C} \Rightarrow \frac{1}{s}$$

$$B = \frac{1}{s^2} \qquad A = \frac{1}{s^3 \cdot P} \qquad C = \frac{1}{s^2 \cdot P}$$

$$W = \frac{F_{A0} - F_A}{-r_A}$$

$$F_A = C_A \cdot v$$

$$P_A = C_A \cdot RT$$

$$= \frac{F_A}{v} \cdot RT$$

$F_A = \frac{mol}{s}$

$C_A = \frac{mol}{L}$

$$W - \frac{F_{A0} - F_A}{-r_A} = 0$$

$$-r_A = \frac{k_1 k_2 k_3 P_A}{k_2 k_3 + k_1 k_3 P_A + k_1 k_2 P_A}$$

Plug flow reactor

$$\frac{dF_A}{dW} = -r_A$$

```
def dFAdW(FA, W):
    return -rA(FA)
```

$F_A(W=0) = F_{A0}$ initial condition

integrate