$$aA + bB \underset{k_r}{\overset{k_f}{\rightleftharpoons}} cC + dD$$

$$\frac{1}{a}\frac{d[A]}{dt} = k_r [C]^c [D]^d - k_f [A]^a [B]^b$$

at Eq: $\frac{d[A]}{dt} = 0$

$$0 = k_r [C]^c [D]^d - k_f [A]^a [B]^b$$

$$\frac{[C]^c [D]^d}{[A]^a [B]^b} = \frac{k_f}{k_r} = K_c$$

$$K_p = \frac{(P_C/P^\circ)^c (P_D/P^\circ)^d}{(P_A/P^\circ)^a (P_B/P^\circ)^b}$$

$$[X_i] = \frac{n_i}{V} = \frac{x_i P}{R_u T} = \boxed{\frac{P_i}{R_u T}}$$

$\nu' = a + b + \dots$ (reactants)

$\nu'' = c + d + \dots$ (products)

$$K_c = \frac{[C]^c [D]^d}{[A]^a [B]^b} = \frac{(P_C/R_u T)^c (P_D/R_u T)^d}{(P_A/R_u T)^a (P_B/R_u T)^b}$$

$$= \underbrace{\frac{(P_C/P^\circ)^c (P_D/P^\circ)^d}{(P_A/P^\circ)^a (P_B/P^\circ)^b}}_{K_p} \left(\frac{P^\circ}{R_u T}\right)^{\overbrace{c+d}^{\nu''} \overbrace{-a-b}^{-\nu'}}$$

$$\boxed{\begin{aligned} K_c &= K_p \left(\frac{P^\circ}{R_u T}\right)^{\nu''-\nu'} \\ K_p &= K_c \left(\frac{R_u T}{P^\circ}\right)^{\nu''-\nu'} \end{aligned}}$$

$$\frac{k_f}{k_r} = K_c = K_p \left(\frac{P^\circ}{R_u T}\right)^{\nu''-\nu'} = \exp\left(\frac{-\Delta G^{\circ}_{rxn}}{R_u T}\right)\left(\frac{P^\circ}{R_u T}\right)^{\nu''-\nu'}$$

$$aF + bOx \xrightarrow{k} Prod$$

$$\cancel{\frac{1}{a}}\frac{d[F]}{dt} = -k[F]^a [Ox]^b$$

0.5 F

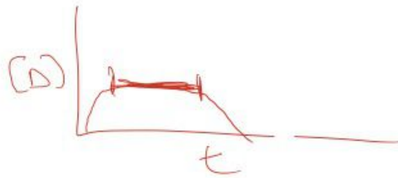
1.2 Ox

$$A + B \xrightarrow{k_1} C + D$$

$$D + E \xrightarrow{k_2} C + A$$

$$k_1 \ll k_2$$

$$\cancelto{0}{\frac{d[D]}{dt}} = k_1[A][B] - k_2[D][E]$$



$$0 = k_1[A][B] - k_2[D]_{ss}[E]$$

$$[D]_{ss} = \frac{k_1[A][B]}{k_2[E]}$$

$$\frac{d[D]_{ss}}{dt} = \frac{d}{dt}\left(\frac{k_1[A][B]}{k_2[E]}\right)$$