

## → 2nd Order rxn



$$R = -\frac{d[A]}{dt} \rightarrow \textcircled{i}$$

$$R = k[A]^2 \rightarrow \textcircled{ii}$$

समी. (i) & (ii) से

$$-\frac{d[A]}{dt} = k[A]^2$$

$$\frac{d[A]}{[A]^2} = -k dt$$

$$t=0, [A] = [A]_0$$

$$t=t, [A] = [A]$$

दोनों तरफ समाकलन करने पर

$$\int \frac{d[A]}{[A]^2} = \int -k dt$$

$$\frac{1}{[A]} = kt + C \rightarrow \textcircled{iii}$$

जब  $t=0, [A] = [A]_0$

$$\frac{1}{[A]_0} = k \times 0 + C$$

$$C = \frac{1}{[A]_0}$$

C का मान समी. (iii) में रखने पर

$$\frac{1}{[A]} = kt + \frac{1}{[A]_0}$$

$$kt = \frac{1}{[A]} - \frac{1}{[A]_0}$$

$$k = \frac{1}{t} \left( \frac{1}{[A]} - \frac{1}{[A]_0} \right)$$

\* Half-life (अर्ध आयु)

↓  
 $t_{1/2}$



$$t=0 \cdot [A]_0$$

$$t_{1/2}, \frac{[A]_0}{2}$$

zero order

$$k = \frac{[A]_0 - [A]}{t}$$

$$k = \frac{[A]_0 - \frac{[A]_0}{2}}{t_{1/2}}$$

$$t_{1/2} = \frac{[A]_0}{2k}$$

First order

$$k = \frac{2.303}{t} \log \frac{[A]_0}{[A]}$$

$$k = \frac{2.303}{t_{1/2}} \log \frac{[A]_0}{\frac{[A]_0}{2}}$$

$$t_{1/2} = \frac{2.303}{k} \log 2$$

$$t_{1/2} = \frac{2.303 \times 0.301}{k}$$

$$t_{1/2} = \frac{0.6932}{k}$$

## Second order

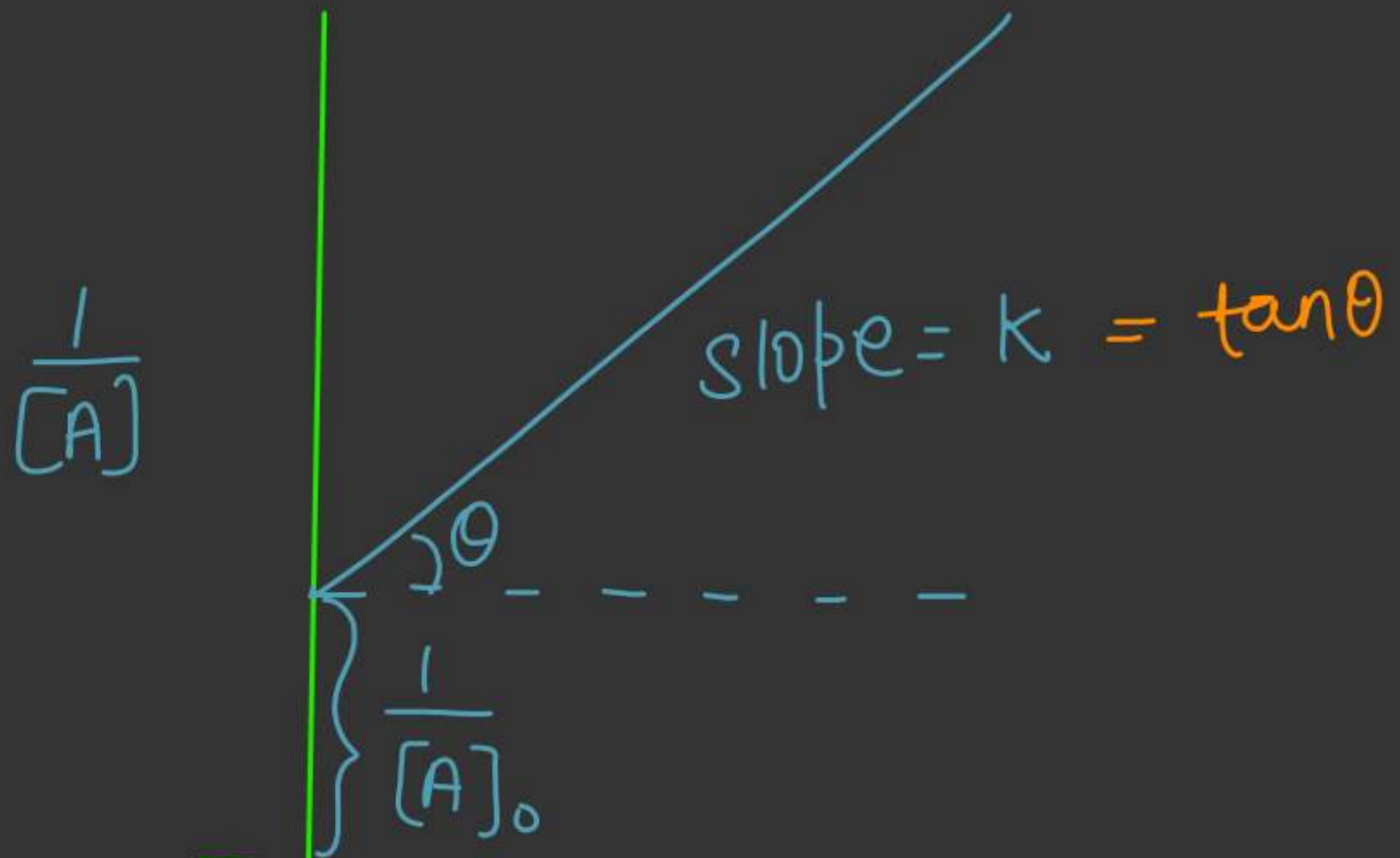
$$\frac{1}{[A]} = kt + \frac{1}{[A]_0}$$

$$y = mx + c$$

\* Half-life (अर्ध आयु)

$$k = \frac{1}{t} \left( \frac{1}{[A]} - \frac{1}{[A]_0} \right)$$

$$k = \frac{1}{t_{1/2}} \left( \frac{1}{\frac{[A]_0}{2}} - \frac{1}{[A]_0} \right)$$



$$t_{1/2} = \frac{1}{k} \left( \frac{2}{[A]_0} - \frac{1}{[A]_0} \right)$$
$$t_{1/2} = \frac{1}{k} \times \frac{1}{[A]_0}$$

$$t_{1/2} = \frac{1}{k[A]_0}$$