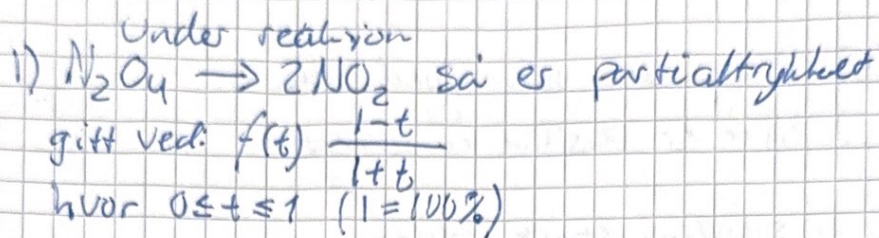


Prosjekt 2

Oppgave 2

Under reaksjon



$$a) f(t) = \frac{u(t)}{v(t)} \Rightarrow f'(t) = \frac{u'(t) \cdot v(t) - u(t) \cdot v'(t)}{(v(t))^2}$$

$$u(t) = 1-t \quad u'(t) = -1$$

$$v(t) = 1+t \quad v'(t) = 1$$

$$f'(t) = \frac{-1 \cdot (1+t) - (1-t) \cdot 1}{(1+t)^2}$$

$$f'(t) = \frac{-1-t-1+t}{(1+t)^2} = \frac{-2-2t}{(1+t)^2} = \frac{-2(1+t)}{(1+t)^2}$$

$$= -\frac{2}{1+t}$$

b) Hva er partialtrykket en tredjedel inn i reaksjon?

$$f\left(\frac{1}{3}\right) = \frac{1 - \left(\frac{1}{3}\right)}{1 + \left(\frac{1}{3}\right)} = \frac{\frac{2}{3} - \frac{1}{3}}{\frac{2}{3} + \frac{1}{3}} = \frac{\frac{1}{3}}{\frac{3}{3}} = \frac{1}{3} = \frac{1}{3}$$

$$2) V(t) = V_0 e^{\frac{\lambda}{\alpha}(1-e^{-\alpha t})}$$

$V(t)$ er substansens volum ved tiden t .

V_0, λ og α er positive konstanter.

a) V_0 er substansens start volum

$$\lim_{t \rightarrow \infty} V(t) = \lim_{t \rightarrow \infty} V_0 e^{\frac{\lambda}{\alpha}(1-e^{-\alpha t})}$$

$$\lim_{t \rightarrow \infty} (1-e^{-\alpha t}) \Rightarrow 1-0=1$$

$$\Rightarrow \lim_{t \rightarrow \infty} V(t) = V_0 e^{\frac{\lambda}{\alpha} \cdot 1}$$

e^{-x} vil gå mot 0 når $V(t) \rightarrow \infty$.

$$b) V(0) = V_0$$

$$V(t) = V_0 e^{\frac{\lambda}{\alpha}(1-e^{-\alpha t})}$$

$$(e^{g(x)})' = e^{g(x)} \cdot g'(x)$$

$$g(t) = \frac{\lambda}{\alpha}(1-e^{-\alpha t})$$

$$g'(t) = \frac{\lambda}{\alpha}(0 - (e^{-\alpha t})'), \quad (e^{-\alpha t})' = e^{-\alpha t} \cdot (-\alpha t)'$$

$$= e^{-\alpha t} \cdot -\alpha \cdot 1$$

$$V'(t) = e^{\frac{\lambda}{\alpha}(1-e^{-\alpha t})} \cdot e^{-\alpha t} \cdot -\alpha$$

$$V(0) = 1 \cdot 1 \cdot -\alpha$$

$$V(0) = e^{\frac{\lambda}{\alpha}(1-e^{-\alpha \cdot 0})} \cdot e^{-\alpha \cdot 0} \cdot -\alpha$$

$$V(0) = -\alpha$$

$$= e^{\frac{\lambda}{\alpha}(1-1)} \cdot 1 \cdot -\alpha$$

c) $V_0 = 0,5 \text{ mm}^3$, $\alpha = 0,1$, $\lambda = 1$

$$V(t) = 0,5 \cdot e^{\frac{1}{\alpha t}} (1 - e^{-0,1t})$$

Som vi kan se ved grafen, så går $e^{-\lambda}$ mot 0, slik som i a)