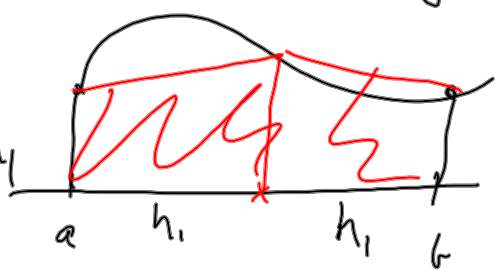
$$I_0 = \frac{f(a)+f(b)}{2}(b-a)$$

$$I_1 = \frac{f(a)+f(a+h_1)}{2}\cdot h_1 + \frac{f(a+h_1)+f(b)}{2}\cdot h_1$$

$$= \frac{f(a)+f(b)}{2}\cdot h_1 + f(a+h_1)\cdot h_1$$



$$x' = f(t, x) = 1 + x^2$$

$$f\left(t_k + \frac{h}{2}, \frac{x_k + x_{k+1}}{2}\right) = 1 + \left(\frac{x_k + x_{k+1}}{2}\right)^2$$

okt 31-17:10

Ex. 16.4.4 i Kalkulus.

Vi har en dyrepopulasjon som vokser med vekstrate r. - urealistisk.

Mer rimelig å si at det fins et maksimalt antall individer N som kan leve med de gitte ressursene.

Kan beskrives ved

$$y'(t) = r \cdot y(t)\left(1 - \frac{y(t)}{N}\right), \quad y(0) = y_0$$

Hvis $y(t) \neq 0$ og $y(t) \neq N$ har vi

$$\frac{y'(t)}{y(t)(1 - y(t)/N)} = r$$

Integrerer på begge sider

$$\int \frac{y'(t)\,dt}{y(t)(1 - y(t)/N)} = \int r\,dt = r \cdot t + C$$

$$\int \frac{dy}{y(1 - y/N)}$$

$$\frac{1}{y(1-y/N)} = \frac{1}{y} + \frac{1/N}{1 - y/N} = \frac{1}{y} + \frac{1}{N-y} = \frac{N-y+y}{y(N-y)}$$

$$= \int \frac{dy}{y} + \int \frac{dy}{N-y}$$

$$= \ln|y| - \ln|N-y| = \ln\left|\frac{y}{N-y}\right| = \frac{N}{y(N-y)}$$

$$\ln\left|\frac{y}{N-y}\right| = r \cdot t + C$$

$$e^{\ln\left|\frac{y}{N-y}\right|} = e^{r \cdot t + C}$$

$$\left|\frac{y}{N-y}\right| = e^{C} \cdot e^{rt}$$

$$\frac{y}{N-y} = \underbrace{\left(\pm e^{C}\right)}_{D} \cdot e^{rt}$$

$$\frac{y}{N-y} = D \cdot e^{rt}, \quad D \in \mathbb{R},\ D \neq 0$$

$$y = (N-y) D e^{rt} = N \cdot D e^{rt} - y \cdot D e^{rt}$$

$$y = \frac{D \cdot N e^{rt}}{1 + D e^{rt}} = \frac{N}{1 + e^{-rt}/D}$$

$$y + y \cdot D e^{rt} = N \cdot D e^{rt}$$

$$y(1 + D e^{rt}) = N \cdot D e^{rt}$$

$$y = \frac{N \cdot D e^{rt}}{1 + D e^{rt}}$$