$$\frac{dy}{dx} = f(x, y)$$

$$x = x_0 \quad y = y_0$$

$$y_1 = y_0 + f(x_0, y_0) h$$
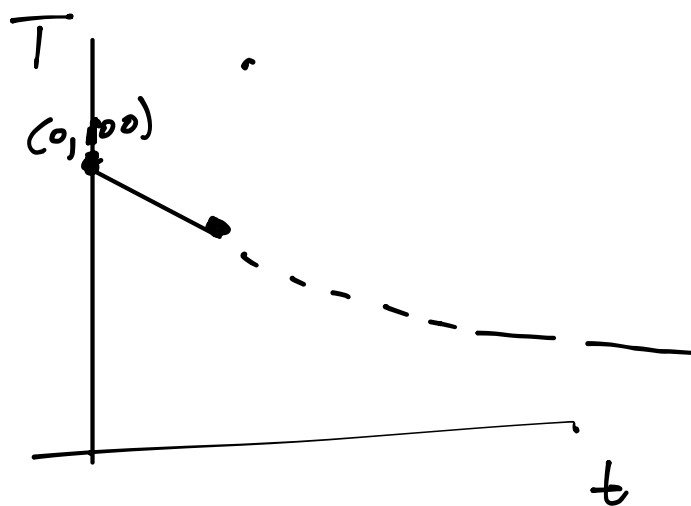
x	y
x_0	y_0
x_1	y_1
x_2	y_2
$\vdots$	$\vdots$

$f(x_1, y_1)$ ---- $y(x)$

(x_2, y_2)

$f(x_0, y_0)$

(x, y_1)

(x_0, y_0)

$\leftarrow h \rightarrow \leftarrow h \rightarrow x_2 = x_1 + h$

$x_0 \qquad x_1 = x_0 + h$
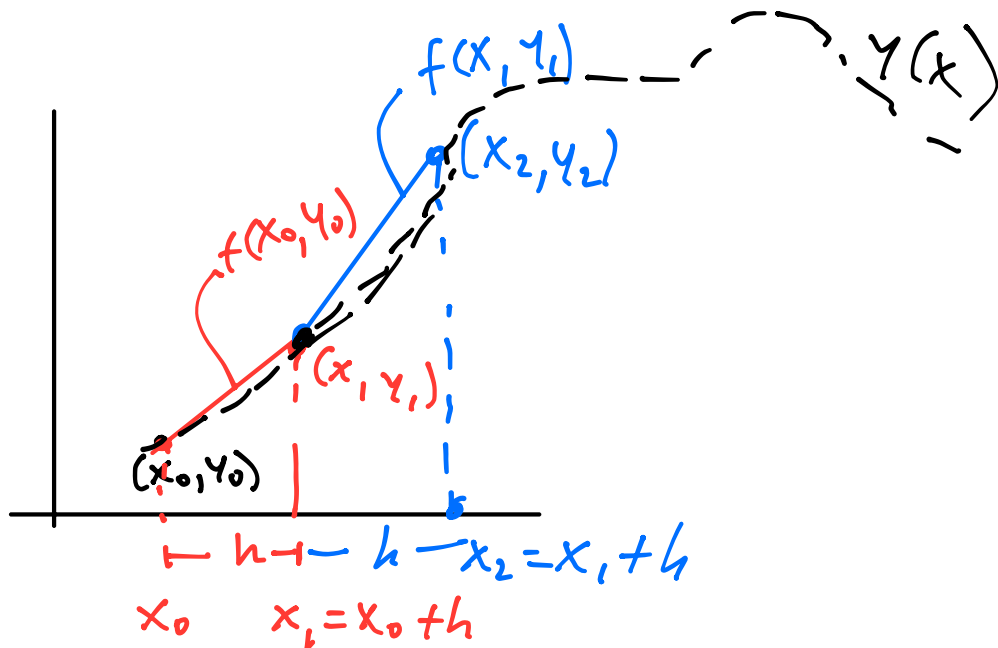
$$\frac{dT}{dt} = \overbrace{-0.01(T - 20)}^{f(T)}$$

$$t = 0 \quad T(0) = 100$$

$$\Delta t = h$$

T

$(0, 100)$

t

$$\frac{T_{k+1} - T_k}{\Delta t} = -0.01(T_k - 20)$$

$$T_{k+1} = T_k - \Delta t \cdot 0.01 \cdot (T_k - 20)$$

$$T_1 = T_0 - \Delta t \cdot 0.01 (T_0 - 20) \qquad t_1 = t_0 + \Delta t$$

$$T_2 = T_1 - \Delta t \cdot 0.01 (T_1 - 20) \qquad t_2 = t_1 + \Delta t$$

t	T
0	100 ✓
Δt	T_1
$2\Delta t$	T_2
$\vdots$	$\vdots$

$$\frac{dT}{dt} = -0.01\,(T-20)$$

$$\int_{100}^{T} \frac{d\bar{T}}{T-20} = \int_{0}^{t} -0.01\,dt$$

$$\ln\left(\frac{T-20}{80}\right) = -0.01\,t$$

$$\frac{T-20}{80} = e^{-0.01\,t}$$

$$T = 20 + 80\,e^{-0.01\,t}$$