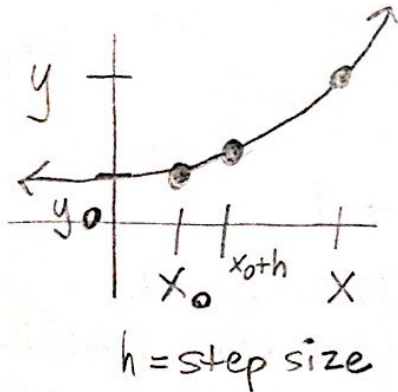


6.1 Euler's Method

* iterative (recursive) process which gives a numerical method to approximate the particular solution to a DiffEQ.



$$y - y_1 = m(x - x_1)$$

$$y = m(x - x_1) + y_1$$

↓ new y ↓ slope $\frac{dy}{dx}$ ↓ new x ↓ old x ↓ old y
}
h
(stepsize)
 Δx

video

$$* y_{\text{new}} = \frac{dy}{dx} (\Delta x) + y_{\text{old}}$$

↓
step size

① Given $\frac{dy}{dx} = x + y$ and $f(0) = 0$.

Estimate y if $x = 0.5$ using step size of 0.1.

x	y	$\frac{dy}{dx}$
0	0	0
.1	0	.1
.2	.01	.21
.3	.031	.331
.4	.0641	.4641
.5	.11051	.61051

$$y = .1(0) + 0$$

$$y = .1(.1) + 0$$

$$y = .1(.21) + .01$$

$$y = .1(.331) + .031$$

$$y = .1(.4641) + .0641$$