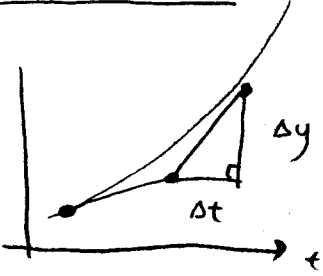


Week 1 & 2 summary:

- In many real-world situations, there are simple relations between a function and its derivatives. These can be expressed as differential equations.
- Exponential growth: $y' = ky$
Exponential decay: $y' = -ky$
Decay $\rightarrow$ value: $y' = k(A - y)$.
- Slope fields: A way to "visualize" all solutions to an ODE.
 We can sketch a slope field using isoclines:
 Set $y' = \text{const.}$, plot the resulting line/curve.
- Plotting solutions to autonomous ODEs; $y' = f(y)$.
- Euler's method: $y' = f(t, y)$, $y(t_0) = y_0$, step-size h .

Method: $(t_{k+1}, y_{k+1}) = (t_k + \underbrace{h}_{\Delta t}, y_k + \underbrace{h \cdot f(t_k, y_k)}_{\Delta y})$
- Solving ODEs by separation of variables.