

Week 3 summary:

- Difference between the general solution and a particular solution, given initial conditions.

- Modeling falling objects with air resistance (decay $\rightarrow$ value ODE)

- An ODE is linear if $y'(t) = a(t)y(t) + f(t)$

and homogeneous if $y'(t) = a(t)y(t)$.

- 3 ways to solve linear ODE's:

(i) Integrating factor: Write as $y' - ay = f$

int. factor = $e^{-\int a(t) dt}$ "product rule in reverse."

(ii) Variation of parameters: $y(t) = v(t)y_h(t)$, where $y_h(t)$ solves the homog. eq'n $y_h' = a(t)y_h$.

(iii) $y(t) = y_h(t) + y_p(t)$: for any particular solution $y_p(t)$.

- Connection between parametrized lines & solutions to linear ODE's

$$y(t) = Cy_h(t) + y_p(t)$$

vs. $\ell = C\vec{v} + \vec{w}$

