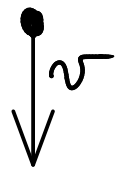


Slope fields are useful to get qualitative info about solutions:

Example Object falling with air resistance
 let's take downward velocity to be positive. The simplest model is when air resistance is proportional to velocity

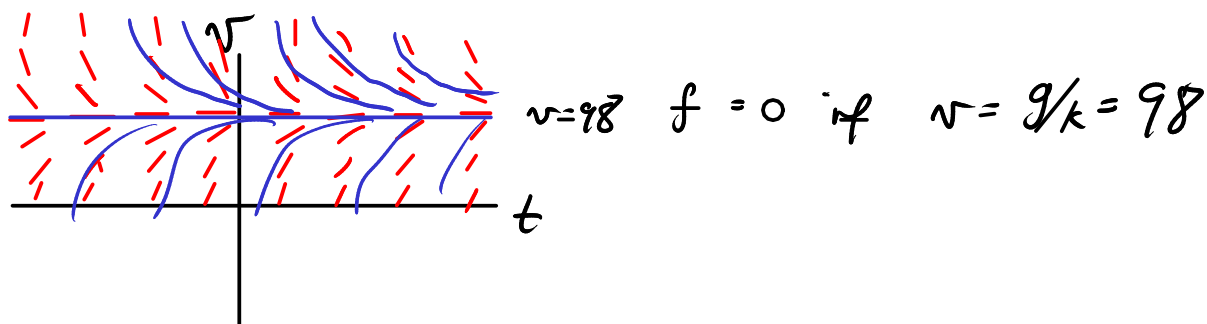


$$a = \frac{dv}{dt} = g - kv$$



Let's say $g = 9.8 \text{ m/s}^2$ and $k = 0.1 \text{ s}^{-1}$

The equation is $\frac{dv}{dt} = f(t, v)$ so plot slope field in (t, v)



All solution curves asymptote to the constant solution $v = 98 \text{ m/s}$ ← called terminal velocity.

More generally, we can consider

AUTONOMOUS FIRST ORDER Diff. Eq. $\frac{dy}{dx} = f(y)$ (no x on RHS)

Then the slope field only varies in the vertical direction