1.1:

Equilibrium Solution

Graphed slope field of $\frac{dv}{dt} = f(t, v)$

*** can use slope field to determine behavior of v including as $t \to \infty$.

1.2:

Solved $\frac{dy}{dt} = a(y - \frac{b}{a})$

Solution: $y = \frac{b}{a} + ce^{at}$

Initial Value Problem: $y(0) = y_0$

$t = 0, y = y_0$, then $c = y_0 - \frac{b}{a}$

1.3:

ODE vs PDE

order of differential eq'n: order of highest derivative

example of order n: $y^{(n)} = f(t, y, ..., y^{(n-1)})$

Linear vs Non-linear

linear: $a_0(t)y^{(n)} + \ldots + a_n(t)y = g(t)$

Existence and Uniqueness of Solutions

CH 2: Solve $\frac{dy}{dt} = f(t, y)$

2.1: First order linear eqn: $\frac{dy}{dt} + p(t)y = g(t)$

Ex 1: $2\frac{dy}{dt} + 10y = 16$