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: $a_0(t)y^{(n)} + ... + a_n(t)y = g(t)$

Existence and Uniqueness of Solutions

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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: $y' = -ay + b$

Ex 2: $y' + 3t^2y = t^2$, $y(0) = 0$

Note: could use section 2.2 method, separation of variables to solve ex 1 and 2.

Ex 3: $t^2y' + 2ty = tsin(t)$