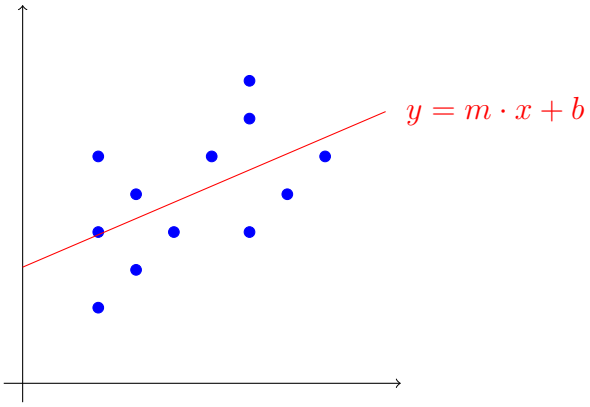
Modeling Intro

Definition : Mathematical Modeling

Mathematical representation of the essential elements of a system.

For example, the following could be a model:



Models could also be highly complicated mathematics.

We are usually interested in systems that change in time (dynamical systems):

- Differential Equations - This will be much of our focus
- Difference Equations

Models can range vastly in their complexity, from simple models (like exponential growth $P = P_0 \cdot e^{k \cdot t}$, $\frac{dP}{dt} = k \cdot P$), to highly complex models (like GCMs which rely on air / CO_2 flux, pressure, ocean flows, geography, and chemical and biological factors) Simple models are often studied using mathematical analysis, whereas complex models are studied through simulations and numerical solutions. Math 287 lives somewhere between these two ends of the spectrum.