1.1.0 Introduction

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From weather to food production, we are affected by changes in our environment. In this section you will learn how mathematicians can model or predict sudden changes in the environment and other systems.

In particular, you will

- Learn about the concept of a **bifurcation**, a sudden major change in the expected behavior of a system in response to a small change in parameter, through examples from climate dynamics and fishing.
- Analyze a logistic differential equation model of a fish population and explore what happens when we include the effect of fishing. (If you are not familiar with such an equation, check out the section on Population Dynamics.)
- Learn to use graphical representations of differential equations to determine the effect of fishing on equilibria of the system and the long-term behavior of the population

> For this section, you'll need to be comfortable with **derivatives**, **interpreting first-order differential equations** and **parameters**.
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> For an introduction to parameters, review Section 1 on Item Response Theory.

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