1.12 Writing assignment: Comparing harvesting models

Goals

The goals of this assignment are:

- to practice using the Juypter notebooks for a longer document,
- to practice "technical writing", and
- to analyze differential equations that have a "free parameter."

Tasks

Write a report that analyzes and compares the harvesting models

$$\frac{dP}{dt} = rP\left(1 - \frac{P}{K}\right) - c$$

and

$$\frac{dP}{dt} = rP\left(1 - \frac{P}{K}\right) - bP.$$

Here we are viewing r and K as fixed constants, while c and b are parameters (that is, constants that we can "choose").

For each model you should address the following:

- What are the equilibrium solutions?
- What is their stability?
- What is the maximum amount that can be harvested at equilibrium?

You can also address other questions/issues you find interesting.

Remember that your analysis should be done in terms of the variables r and K (though you will need to fix numbers for the purpose of creating plots).

After you have make a comparison between the two models.

Evaluation

Your report will be evaluated based on the following:

- Notebook: Is the Jupyter notebook format used effectively? Are you using Markdown/LaTeX to write your narrative? Are you generating meaningful plots? etc.
- Writing: Is the mathematics written in complete sentences? Are technical words used correctly? Etc.
- Mathematics: Is the math content correct?