

Writing assignment: Comparing harvesting models

The purpose of this report is to compare two types of harvesting: fixed-rate and percentage-rate. For the purposes of illustration, consider the following scenario.

Paul has decided to enter the yogurt starter business, in which he will let yogurt culture grow in large vats. As the culture grows, he will remove some of the culture in order to sell it. During this process, he is careful to maintain a constant food source.

Paul is wondering: Does it make a difference whether he removes yogurt culture at a fixed rate or if instead he continuously removes a certain percentage of the culture? Your task is to address this question.

For the purposes of your analysis, you should assume that the yogurt culture population can be modeled using a logistic model with harvesting term.

- You should analyze two different models – one with constant harvesting and one with a harvesting term that is proportional to the population.
- You should begin your report with a short description of the models you are using; include a short discussion about why the models are reasonable and what drawbacks there may be for using these models.
- Your report should include qualitative analyses of each model, as well as a comparison of the two situations. Remember, the idea is to show off your qualitative analysis skills!
- I encourage you to include useful plots and figures.
- If you want, you can also include numerical analyses, though this is not required.
- Do not simply give Paul advice as to which method of harvesting he should use – your job is simply to model each case and present the results.

The report must be written using L^AT_EX. You will be graded on the validity and completeness of your mathematical analysis, on your writing, and on your use of technology.