

Submit your work on Catcourses by February 24th at 11:59pm

Please be aware that in this homework, your approach and your justifications will be given **a lot** more importance than your final results. This means that you should think about how you will present and explain your work so that what you turn in makes sense, even if it is read by someone unfamiliar with the problem. This is a good training for your final report project.

Read entirely the homework assignment first !

Groups will be randomly assigned soon. In each you will have to assign:

- A group leader (manages communication within the group)
- A work submission leader (submits the group work on behalf of the group)

[Slither.io](#) is a multiplayer online video game where players control an avatar resembling a worm, which consumes multicolored pellets, both from other players and ones that naturally spawn on the map in the game, to grow in size. The objective of the game is to grow the longest worm in the server. The goal is to provide some mathematical model of this game.

1. First, go play a little bit to understand [Slither.io](#)
2. Come up with a system of equations to model this game using concepts from dynamical systems. Explain your choices (what do you want to track over time), describe all parameters you need, etc. You can make simplifications or assumptions (as many as you feel you need) as long as you explain them. It is up to you to decide initial values for whatever you need and explain your choices.
3. If applicable: find the equilibrium points of your system and study their stability.
4. If applicable: find an expression of your solution.
5. Solve numerically your system. Precise the scheme you use and how you compute the initial condition(s). Try at least 3 different initial situations.
6. Analyze your results, comment on your model, and discuss limitations. In particular discuss what could be added to your model, and how you would proceed.
7. Submit all your answers **in a single .ipynb** on Catcourses your answers under the assignment **Homework 3 (group)**. The work submission leader of each group is responsible for the submission.