Numerical Project

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1 Functional requirement of the program

1.1 The project

The goal of this project is to simulate the movement of a fluid through different geometries. The program create a box of choosen size, builds a geometry inside it and simulates the movement of a given fluid.

1.2 The files

In order to increase readability, the project is made of several files. I made the choice to work with Object Oriented Programming.

- main.py: This file calls for the needed functions/class
- matrices.py: This file contains the class "Matrices", it builds the geometry, the different matrices to plot and stores them
- plot.py: This file plots the matrices built in "matrices.py"
- parameters.py: This file contains all the variables that can be changed by the user
- data_check.py: This file checks the variables and makes sure that the program will run

1.3 The data

This project uses several piece of data set by the user to work.

- N_x and N_y are the size of the domain
- h represents the size of a cell
- $geometry$ corresponds to the choosen geometry
- $angle$ corresponds to the angle of the widening/shrinkage geometry
- v_x is the Neuman condition
- ϕ_{ref} is the Dirichlet condition