The purpose of this report is to comment and explain the November 24 long exercise. The delivery consists of a python notebook, with the solution of the exercise and this *pdf* file, the purpose of which has been already explained.

As you can see in the python notebook, for the realization of this exercise, we have used *Ripser* library. The first thing you need to do is to install the required packages, as I did in the first line of code. Once you have installed the packages, you can start by defining the point cloud. A way to do it is to create a list with the points and later on, redefine it as a matrix, as I did. Once here, the only thing left to do is to call the python functions which will do the hard work. More precisely, the function *plot_diagrams* shows the persistence diagram for the Vietoris-Rips filtration once we call the *ripser* function, which compute the finite collection of intervals of the persistence module, i.e., if we call V a persistence module of finite type, the funcion *ripser* computes the intervals $\{I_1, \dots, I_n\}$ such that

$$V \cong \mathbb{F}(I_1)^{m_1} \oplus \cdots \oplus \mathbb{F}(I_n)^{m_n}, \;\; m_i \geq 1 \; \forall i$$

where I_i is either $[a_i, b_i)$ or $[a_i, \infty)$.

For the landscape functions, we have used the *plot_landscape_simple* function that computes the landscape functions for the required H_i.

Notice that, even if it was only requested to provide information for H_1, we have also added the information for the H_0 and H_2, since it did not cost any extra effort and further completes the exercise.