In the .py script, I wrote a function "populations( )" using the given equation and values to model the predator-prey relation. This function returns a panda data frame with four columns where the first two columns refer to rabbits and cats population, and the last two columns refer to dynamics. It will denote that these dynamics can be positive or negative.

I have run this function for t = 1000 time steps and stored the data as df, then described and calculated the correlation between them (columns).
We can see that the dynamics of those two populations are negatively correlated.

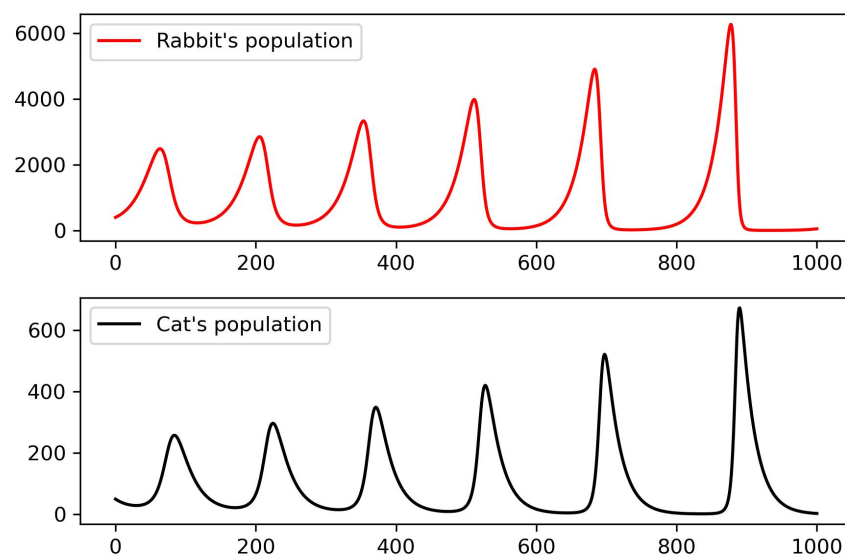From the data, found the following figures:

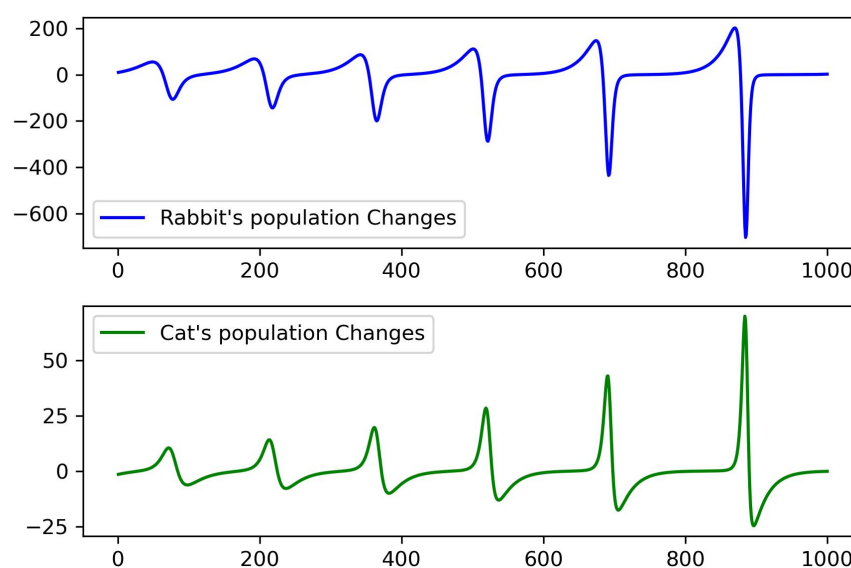Fig1: Rabbit's and Cat's population against time steps

Fig2: Dynamic of Rabbit's and Cat's population against time steps

If we plot the population of the rabbits against the cats, we can see a cyclical or a rotating behavior. The shifts are affected by the critical values of the rabbits and cats population.
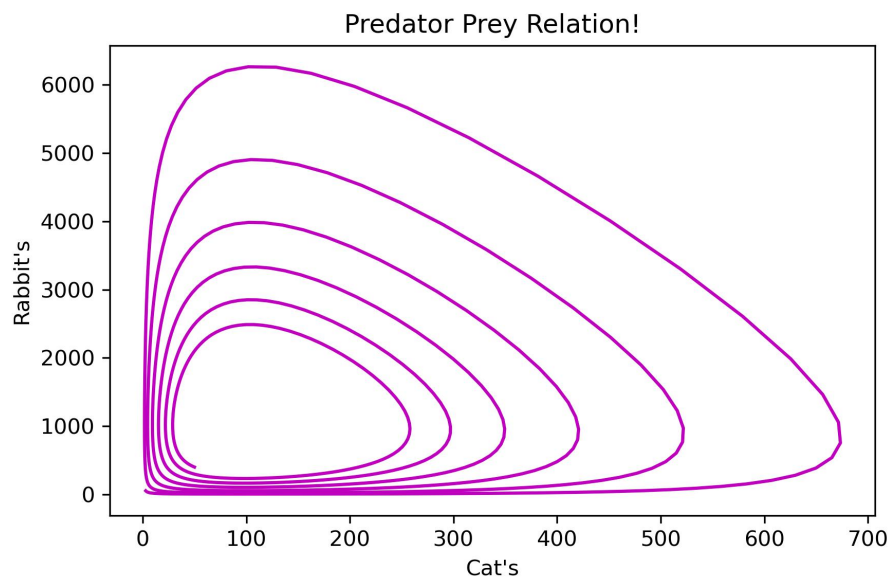

Fig3: Rabbit's population against cat's population