3. The actual Science

a. Here were the values obtained from dataset_01:

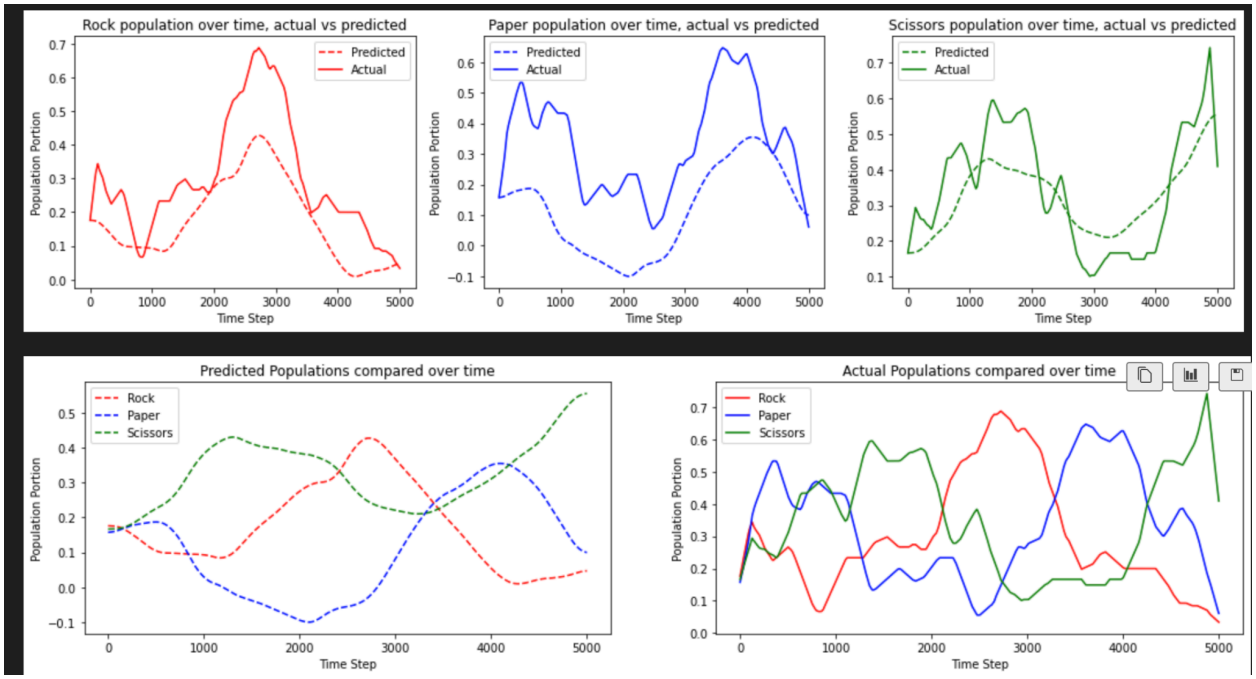
[[-0.0029, 0.0026]

[0.0032, -0.0027]

[-0.0019, 0.0023]]

One symmetry I noticed with all the datasets is that the (0,0), (1,1), (2,0) coefficients are negative, and the other coefficients are positive. I think this is because those coefficient represents the predator-prey relationship between agents where the agent whose derivative is being calculated is the prey, and thus reduces in population when those populations interact, whereas the positive values are because they represent predator-prey relationship between agents where the agent whose derivative is being calculated is the predator.

Dataset_01 results:



In the datasets, there are often many peaks and falls. Generally, when one population is at its peak, the other two populations are at their minimum or close to a minimum, and when steady state is reached, only one population is the winner. This can be seen in the above figures, where when scissors is at a local maximum, rock is at a local minimum,

and paper is seen descending to a local minimum as well. But, when rock is at a local maximum, scissors are approaching a local minimum, and paper is increasing from being at a minimum point.

If the scissors and paper forces were switched so paper was the predator and scissors was the prey, then paper would be a predator for both rock and scissors, and rock and scissors would both be prey to rock, and scissors would also be prey to rock. The scissors populations would generally decline to zero the fastest because they are not a predator and cannot repopulate. After scissors population is zero, the rock population would also decline very quickly to zero because rock has no way to repopulate and is only prey to paper. Paper would always reach 1 at the steady state, while paper and scissors went to 0 in this setup.

If instead, the experiment was set up so rocks were "birthed" sporadically, the rocks would more likely be winners by the steady state because they have a way to repopulate without needing prey. Even if rock eliminated all the scissors agents, it'd still be able to survive against paper because it can repopulate. Although this would not mean rocks are guaranteed to win every time, if paper can drive paper to zero population so that paper cannot repopulate anymore.