

# Observation and analysis of unstructured data in RPS model

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## ABSTRACT

Biodiversity occupies an extremely important part in ecology. The rock-paper-scissors(RPS) game model is a representative example that models the important ecosystem phenomenon of cyclic competition. This model has provided insights into complex biodiversity patterns that were inaccessible through classical method.

The goal of our research is to incorporate evolutionary dynamical features such as mobility. We will quantify the diversity of species in a lattice structure, using each individual species as the reference point. Specifically, we will measure how many different species are present in the vicinity of each species. We will then calculate the average of these quantified values for all species, and we refer to this new measure as an “index”. This would allow us to explain various evolutionary dynamical phenomena observed in simulations and significantly reduce the time required to determine the timing of extinction and coexistence. Furthermore, it would enable us to predict extinction and coexistence even without knowing the values of various parameter, such as mobility, that are determined before starting the simulation.

## REFERENCES

1. Reichenbach, Tobias, Mobilia, Mauro, Frey, Erwin, “Mobility promotes and jeopardizes biodiversity in rock-paper-scissors games,” *nature*, Vol. 448, 2007, pp. 1046-1049.
2. Reichenbach, Tobias, Mobilia, Mauro, Frey, Erwin, “Self-organization of mobile populations in cyclic competition,” *Journal of Theoretical Biology*, Vol. 254, 2008, pp. 368-383.