

Abstract Submitted  
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**Mixed Strategies in cyclic competition**<sup>1</sup> BEN INTOY, MICHEL PLEIMLING, Virginia Tech — Physicists have been using evolutionary game theory to model and simulate cyclically competing species, with applications to lizard mating strategies and competing bacterial strains. However these models assume that each agent plays the same strategy, which is called a pure strategy in game theory, until they are beaten by a better strategy which they immediately adopt. We relax this constraint of an agent playing a single strategy by instead letting the agent pick its strategy randomly from a probability distribution, which is called a mixed strategy in game theory. This scheme is very similar to multiple occupancy models seen in the literature, the major difference being that interactions happen between sites rather than within them. Choosing strategies out of a distribution also has applications to economic/social systems such as the public goods game. We simulate a model of mixed strategy and cyclic competition on a one-dimensional lattice with three and four strategies and find interesting spatial and stability properties depending on how discretized the choice of strategy is for the agents.

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