

***Regularity and time-inhomogeneity in the Wright-Fisher dynamics***,  
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***Abstract***

We will introduce the Wright-Fisher model, a celebrated model in evolutionary dynamics, with a very general function describing natural selection. We will study the dependence between the fixation probability and the initial condition. In particular, we will show that if natural selection is described by an affine function (as is normally used in 2-player evolutionary game theory), the fixation probability is an increasing function in the initial presence, a property that we call "regularity". However, if fitnesses functions are more general, this dependence may be very general. In particular, any fixation probability can be described by a Wright-Fisher process. As a matter of fact, there are situations that are by no means exceptional, where an increase in the initial presence of a type can lead to a decrease in the fixation probability. This phenomena is not possible in Birth-Death processes (e.g. the Moran process).

We will also discuss time-dependent processes and show that evolutionary equivalents of the Parrondo paradox happen in the Moran process, but not in the Wright-Fisher process.

This is a joint work with Max Souza (UFF).