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Evolutionary games on graphs

Evolutionary game dynamics models have been mainly studied on homogeneous infinite populations. However, real populations are neither homogeneously mixed nor infinite. This study investigates the stochastic evolutionary game dynamics in structured populations as represented by graphs. In this talk, we consider analytically the fixation probability and the speed of the evolutionary process (absorption time) when a single mutant individual invades into three simple graphs of finite number of vertices: the star, the circle and the complete graph. Applying the obtained results, it is then shown the significant impact that the structure of the population might have on the evolutionary process. As a specific example, we consider a Hawk-Dove type game. Finally, it is demonstrated that although the update rule (evolutionary dynamics) of the evolutionary process does not significantly affect the evolution of the invader mutants in homogeneous populations, it might cause significant changes in populations with a non-homogeneous structure.

REFERENCES

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