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Evolutionary Dynamics of Signaling Games

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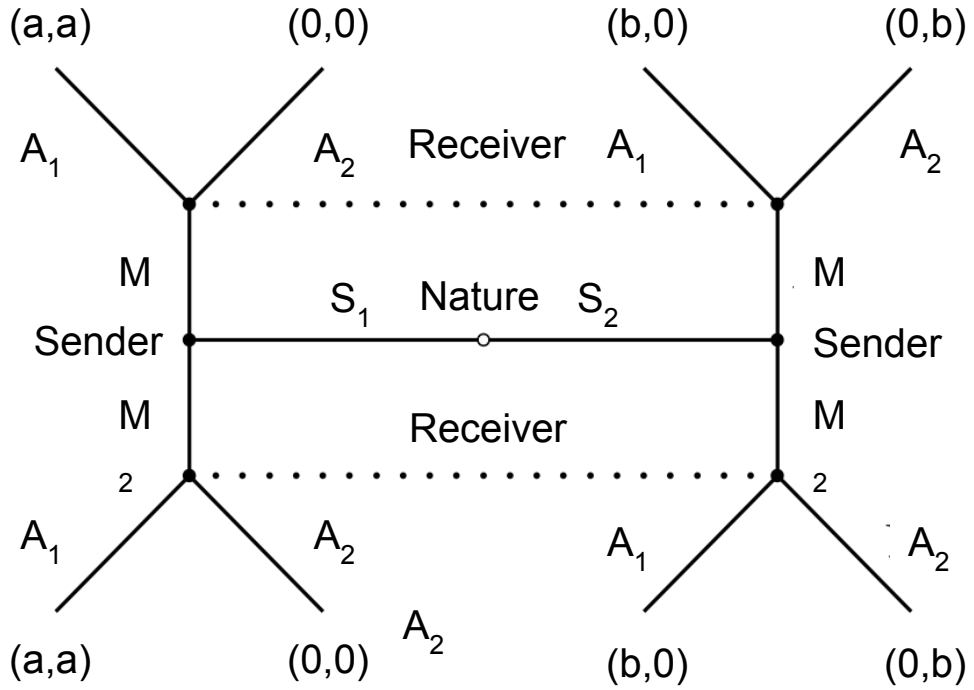
MEFT
Boosting the Future

Framework - Signaling Game

- ➔ Cheap-talk;
- ➔ Partially conflicting interests;
- ➔ Strategies;
- ➔ Honest signaling and interpretation:

$S_1 \rightarrow M_1 \rightarrow A_1$

$S_2 \rightarrow M_2 \rightarrow A_2$



Framework - Evolution

- ➔ Symmetrize the Signaling Game;
- ➔ Evolve populations, allowing players to replicate;
- ➔ Fermi function as a stochastic update rule;
- ➔ Look at β as the selection pressure.

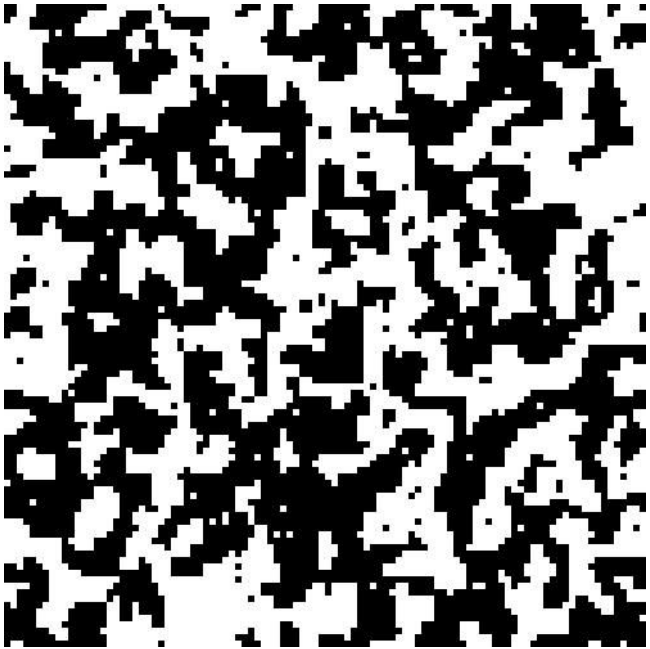
$$p(A \rightarrow B) = \frac{1}{1 + e^{-\beta(\Pi_B(k) - \Pi_A(k))}}$$

Framework - Small Mutation Limit

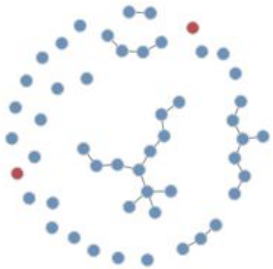
➔ Players will act collectively in a population - monomorphic state;

➔ Mutants can invade these monomorphic populations;

➔ We can compute the transitions from monomorphic state A to B and get the stationary distribution.



Framework - Networks



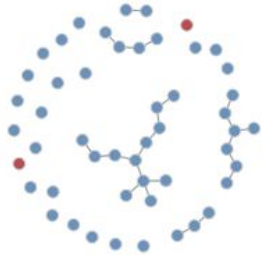
➔Players form links between each other;
➔Links eventually die;
➔When the networks changes very fast, we can compute effective payoffs;
➔Reveals new dynamics.

$$\pi_{AB}' = \frac{\alpha_A \alpha_B}{\alpha_A \alpha_B + \gamma_{AB}} \pi_{AB}$$

Questions

I. How can signaling evolve?

II. Can we assess how much time an evolutionary system is expected to spend in each signaling equilibria?



III. What's the role of (dynamical) structured populations in the emergence of signaling systems?

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