

Conflict and Cooperation in Microorganisms

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Exercise 1

Analyze this game with different conditions
e.g., $T > R > P > S$, $T > R > S > P$, ...

		C	D
C		R	S
D		T	P

R: **R**eward for mutual cooperation

P: **P**unishment for mutual defection

T: **T**emptation to defect

S: **S**ucker's payoff

Exercise2

Assume that the production of a public good has a cost c and generates total benefits that are captured with efficiency e .

- plot the fraction of cooperators, f , in a parameter space (c, e)

- imagine that the payout of defection (and thus of cooperation) is non-linear; plot again the fraction of cooperators, f , in the (c, e) space

- discuss the results

Ref. Gore et al, Nature 459, 253 (2009)

Exercise3

- Simulate the Simpson's paradox in matlab
- Discuss the conditions in which cooperation evolves, plotting several parameters spaces; e.g., number of groups vs. size of groups, etc.