

SEMPARIS – Séminaires en région parisienne

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Séminaire de biophysique ENS-ESPCI

Vendredi 17 Décembre 2021, 13 :00

LPENS, Salle Favard, IBENS (and zoom, link in comments)(— Join Zoom Meeting

<https://us02web.zoom.us/j/81539092951?pwd=a1hZd1ZwVUlnOHpGTlE1a1lONi9JQT09>

Meeting ID : 815 3909 2951 Passcode : 670880 —)

Domaines : physics.bio-ph

Titre : *Generous resource sharing in animals : a reinforcement learning approach*

Orateur : **Andrea Mazzolini (LPENS)**

Résumé : *Resource sharing outside the kinship bonds is rare. Besides humans, it occurs in chimpanzees, wild dogs and hyenas as well as in vampire bats. Resource sharing is an instance of animal cooperation, where an animal gives away part of the resources that it owns for the benefit of a recipient. Taking inspiration from blood-sharing in vampire bats, here we show the emergence of generosity in a Markov game, which couples the resource sharing between two players with the gathering task of that resource. At variance with the classical evolutionary models for cooperation, the optimal strategies of this game can be potentially learned by animals during their life-time. The players act greedily, that is, they try to individually maximize only their personal income. Nonetheless, the analytical solution of the model shows that three non trivial optimal behaviors emerge depending on conditions. Besides the obvious case when players are selfish in their choice of resource division, there are conditions under which both players are generous. Moreover, we also found a range of situations in which one selfish player exploits another generous individual, for the satisfaction of both players. Our results show that resource sharing is favored by three factors : a long time horizon over which the players try to optimize their own game, the similarity among players in their ability of performing the resource-gathering task, as well as by the availability of resources in the environment. These concurrent requirements lead to identifying necessary conditions for the emergence of generosity.*
