STATISTICAL ESTIMATES OF REINFORCEMENT PARAMETERS FROM SINGLE-ANT BINARY CHOICE DATA

Line Le Goff[1], Hugues Chaté[2], Philippe Soulier[3], Guy Theraulaz[4]

(1) MATEMATISKA INSTITUTIONEN, Uppsala Universitet, Sweden
line.le_goff@math.uu.se
(2) SPHYNX, CEA, CNRS, France
(3) MODAL'X, Université Paris Ouest Nanterre, France
(4) DYNACTOM, CNRS, France

We propose a new approach to study trail formation by ant colonies. New through the development of statistical tools allowing the estimation of values and confident regions of the Deneubourg choice function parameters, through the conception and realization of experiments placing ants in simple and relevant situations with binary choices and through the carrying out of a large set of replicas, enough for proper statistical study.

In light of our results, we put forward the thesis that ants are always in a critical behavioral state. In other words, tiny physiological or environmental parameter variations would lead to changes of the ants behavior (selection or non selection path).