

Reinforced random walks and emergence of communication networks: Trail formation at the single-ant level

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Trail formation by deposit of chemical traces (pheromones) has attracted attention for many years now, and it is often presented as an archetypical case of spontaneous emergence of communication networks. In most experiments/observations, many ants are usually involved simultaneously. Here, we report on single-ant experiments performed to investigate the possible precursors of trail formation in minimal settings. Their statistical analysis, combined with mathematical results on reinforced random walks, does reveal a sizeable effect only observable for large-enough sets of replicas.