

Reaction-diffusion and individual-based models of ant movement

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We develop two distinct approaches to modeling, simulation, and mathematical analysis of ant movement. In the first approach, we consider a system of reaction-diffusion equations of chemotaxis type modeling ant foraging dynamics [2]. We present a thorough mathematical analysis of the system [1]. In the second approach, we present and discuss an individual based model for ant movement which takes into account the rules for individual response to pheromones. For this model, we present stability results, and discuss the emergence of collective behavior, including spontaneous trail formation [3]. This is joint work with R. Alonso, T. Goudon, and F. Peruani.

References

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- [3] P. AMORIM, T. GOUDON, F. PERUANI, *An ant navigation model based on Weber's law.*, J. Math. Biol. (2018)