A Study of Ant Foraging Behaviour

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Ants are “Superorganisms”

- Foraging
- Nest building
- Reorganization of tasks
- Waste management
Foraging Behaviour

We've searched dozens of these floor tiles for several common types of pheromone trails. If there were intelligent life up there, we would have seen its messages by now.

The world's first ant colony to achieve sentience calls off the search for us.
Quantitative Models

\[
p_1 = \frac{(x_1 + \alpha)^\beta}{(x_1 + \alpha)^\beta + (x_2 + \alpha)^\beta}, \quad p_2 = 1 - p_1
\]
New Model

Proposed in 2012

“Individual Rules for Trail Pattern Formation in Argentine Ants” by Theraulaz et. al.
New Model

\[ \alpha = A \frac{(L-R)}{(L+R)} \]
- Based on the new model

Given the set of parameters, and initial conditions display the trail (and location of ants) at a later time
Experiment Analysis
Progress so far
References

- Self-organized structures in a superorganism: do ants behave like molecules? -by Claire Detrain and Jean-Louis Deneubourg
- Individual Rules For Trail Pattern Formation in Argentine Ants
- Analytical and Numerical Investigation of Ant Behaviour Under Crowded conditions