

1125-VM-1533

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Sparse Control and Disruptive Behavior in Biological Flocking Models.

The Cucker-Smale model aims at mimicking the flocking behavior of biological agents. This research extends that model and explores how optimal control theory can enhance flocking behavior. One application involves sparse control: how many agents must be controlled to successfully form a flock? The study also focuses on implementing a controlled adversarial agent who serves to disrupt the flocking behavior. I will show results that the number of controlled agents is negatively correlated with flocking time and that disruptive behavior indeed prevents flocking under certain conditions. These findings may broaden the scope of agent-based models and their applications to mathematical biology. (Received September 17, 2016)