Pursuit, Stealth and Cohesion: Lessons from Nature

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Abstract

In this talk we discuss the geometric patterns underlying certain pursuit and prey-capture phenomena in nature, and suggest feedback laws that explain such patterns. Our interest in this problem arises from the study of a motion camouflage (stealth) hypothesis due to Srinivasan and his collaborators [1][2], and the investigation of insect-capture behavior in the FM bat *Eptesicus fuscus* [3][4]. Models of interacting particles, developed in collaboration with Eric Justh [5][6][7], prove effective in formulating and deriving biologically plausible feedback laws that lead to observed patterns. While the primary focus of this talk is on pair-wise adversarial interactions, the results suggest ways to synthesize interaction laws that yield cohesion in collections of particles, and thus possible mechanisms for flocking in nature and in engineered systems.

This work is in collaboration with Eric Justh, and with Kaushik Ghose, Timothy Horiuchi and Cynthia Moss.

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