

Network dynamics in collective motion

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Collective motion patterns are perhaps the most widespread and spectacular manifestations of collective behaviour. The ultimate goal we face is to find unifying principles describing the essential aspects of flocking. A natural approach on the way in this direction is to investigate the delicate dynamics of the interactions between the co-moving individual units. After an introduction to the topic, three new experiments will be discussed. The experimental observations involve the enhanced segregation of two kinds of tissue cells and a study of the hierarchical network dynamics in pigeon flocks as well as their dominance hierarchies. Our animal behaviour studies signal the dawn of a new era of computational ethology.



Fig.1. (Color online) Visualization of the trajectories of the members of a pigeon flock as obtained from downloading the data from the mini GPS devices carried by the birds during their flights.