

Time-asymptotic interactions of two ensembles of Cucker-Smale flocking particles

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ABSTRACT

Emergence of flocking groups are often observed in many complex network systems. The Cucker-Smale model is one of the flocking model, which describes the dynamics of attracting particles. This talk concerns time-asymptotic behaviors of Cucker-Smale particle ensembles, especially for two type of ensembles, usually called the objects and environment. The emergence of local flocking is determined by sufficient initial conditions, coupling strength, and communication weight decay. Our asymptotic analysis follows particle paths of each characteristics and uses the Lyapunov functional approach, which measures the local fluctuations and group separations. The bootstrapping argument is the key idea to prove the gathering and separating behaviors of Cucker-Smale particles simultaneously.