

Life as an Emergent Phenomena

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Life as emergent phenomena is a basic principle of artificial life studies. Emergent phenomenon is a difficult term to define (e.g. unpredictability is often attributed to observer's subjectivity), but here we are looking for a simple objective measure to quantify the emergent phenomena. By take a system size as a controlling parameter, we explored the possibility of large-scale alife models. In particular, taking the example from Craig Reynolds' boid model, we search for the emergent phenomena in large scales. By simulating the swarm size up to 1,000,000 agents by utilizing the GPGPU technique, a qualitative change in swarm formation was found in larger swarms. The concept of top-down causation will be discussed based on these simulation results.