

Abstract Submitted
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Modeling Splitting in Flocking Boids Using Directed Graphs¹

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— We present a dynamic model where a flock of simulated birds (boids) exists in two dimensions. Each boid has a constant speed and a fixed randomly determined number of neighbors defined as those boids that influence the direction of its motion (consensus). The flock of boids is then mapped to a directed graph. Rigorously defined sub-flocks are identified using graph theory and assigned different colors. Modifications of the graph following a specific algorithm (frustration) during the simulation results in emergent behavior. Animations will be shown to demonstrate the emergent behavior. Statistics of the sub-flocks are gathered and presented. This graph analysis can expand our understanding of how and when dynamic emergence occurs in this flocking model. Graph terminology and concepts will be explained as a part of the presentation.

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