

Swarms of Swarms

An extension of the *Heatbug* tutorial

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Abstract

The notion of a “*swarm of swarms*” (i.e., a *hierarchy* of swarms) is a strong theoretical concept meant to provide an explicit, measurable, and examinable link between the micro-level constituents in a complex system and the properties and actions exhibited by the macro-level system. Proposed examples range across such diverse topics as the modeling of biological organisms [3], techniques employed by the U.S. Army in both organization [1] and battle tactics [6], the design of object-oriented programming languages [2], historical societal evolution and interaction [5], and the structure of economic models [4], to name just a few.

The design of the *Swarm* package incorporates the idea of hierarchical swarms as a major design feature. However, currently there are very few available model implementations at the tutorial level that utilize this capability. This paper examines some possibilities and ideas for implementing multi-level swarms, with the end goal of serving as both a research vehicle and a form of mini-tutorial. With this in mind, extensions of the well-known *Heatbug* tutorial code are designed and implemented.

References

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