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## Self-organized collective escape in bird flocks

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# Propositions

accompanying the dissertation

## SELF-ORGANIZED COLLECTIVE ESCAPE IN BIRD FLOCKS

by

Marina Papadopoulou

1. Group members avoid a predator more as the predator gets closer, even when they do not mind its position (Chapter 2).
2. Individual behavior during collective escape cannot be labeled as ‘cooperative’ or ‘selfish’, since the result of individual actions depends on the behavior of the other group members (Chapters 3).
3. How exactly individuals move and interact in a simulation affects the properties of their collective behavior (Chapters 4).
4. Some patterns of collective escape emerge through hysteresis (Chapter 2 & 5).
5. State machines are a great tool for structuring clusters of behavioral rules in individual based models of complex phenomena (Chapter 6).
6. Disentangling the intertwined processes that may lead to the emergence of a pattern is very much needed; identifying a collective pattern as emergent is just the tip of the iceberg.
7. Following Plato’s Allegory of the Cave, the behavior of an individual as part of a collective is only a shadow of its reality. We can approach the behavioral rules that individuals follow through reasoning with computational models.
8. In models of self-organization, just as in scientific writing, *‘perfection is achieved, not when there is nothing more to add, but when there is nothing left to take away (Antoine de Saint-Exupéry)’*.
9. *‘Sometimes science is a lot more art than science.’ –Rick Sanchez, Earth dimension C-137*
10. *‘The bird fights its way out of the egg. The egg is the world. Who would be born must first destroy a world.’ –Hermann Hesse*

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