

Control of Complex, Physically Simulated Robot Groups

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November 14, 2006

Abstract

Actuated systems such as robots take many forms and sizes but each requires solving the difficult task of utilizing available control inputs to accomplish desired system performance. Coordinated groups of robots provide the opportunity to accomplish more complex tasks, to adapt to changing environmental conditions, and to survive individual failures. Similarly, groups of simulated robots, represented as graphical characters, can test the design of experimental scenarios and provide autonomous interactive counterparts for video games. The complexity of writing control algorithms for these groups currently hinders their use. A combination of biologically inspired heuristics, search strategies, and optimization techniques serve to reduce the complexity of controlling these real and simulated characters and to provide computationally feasible solutions.

Keywords: Multiagent, dynamic simulation, group navigation, herds, swarms