

Intelligent Swarm-Finding in Formation Control of Multi-Robots to Track a Moving Target

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Abstract : This paper presents a new approach to control robots, which can quickly find their swarm while tracking a moving target through the obstacles of the environment. In this approach, an artificial potential field is generated between each free-robot and the virtual attractive point of the swarm. This artificial potential field will lead free-robots to their swarm. The swarm-finding of these free-robots does not influence the general motion of their swarm and nor other robots. When one singular robot approaches the swarm then its swarm-search will finish, and it will further participate with its swarm to reach the position of the target. The connections between member-robots with their neighbours are controlled by the artificial attractive/repulsive force field between them to avoid collisions and keep the constant distances between them in ordered formation. The effectiveness of the proposed approach has been verified in simulations.

Keywords : formation control, potential field method, obstacle avoidance, swarm intelligence, multi-agent systems

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