Faculty of Science and Technology
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Intelligent Control of Swarm Robots

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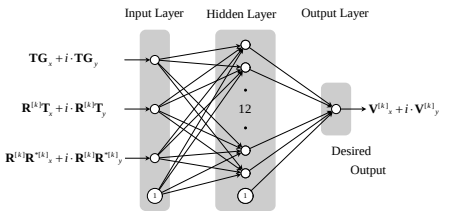
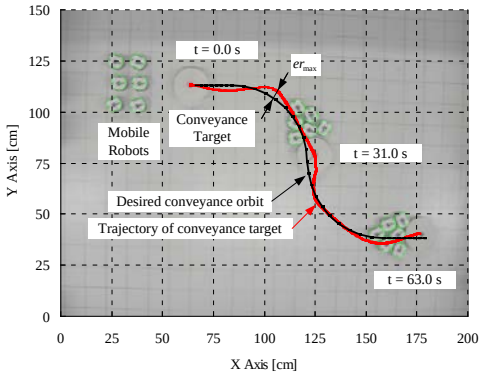
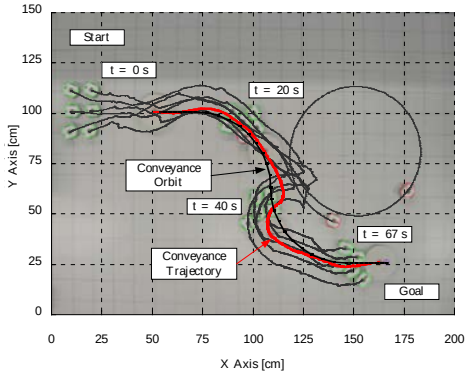
Swarm robots



Complex-valued NN



Experimental Result



Fault tolerance

Content:

The swarm robotics has a problem on the control system design cause of voluminous measured information and motion patterns. Therefore, we propose the control system which uses soft computing scheme e.g. neural networks (NN), fuzzy system and genetic algorithm (GA).

The left figures are our proposed cooperative control system for swarm robots using complex-valued NN (CVNN) and GA. The CVNN can treat a two dimensional position information and adaptable for control of mobile robots. The system inputs a position information for CVNN and outputs a velocity vector and parameters of CVNN are optimized by GA. We confirmed a tracking performance for desired conveyance orbit, and a fault tolerance performances of some robot's breakdown.

Moreover, we propose an extraction system of human operation skills using datamining method and analyze a behavior of robots basis on simple motion rules.

Keywords : Swarm robotics, Machine learning, Cooperative control

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