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Multi-Agent Coverage Control with Bounded Gain Forgetting Composite Adaptive Controller

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Abstract : In this paper, we present an adaptive controller for decentralized coordination problem of multiple non-holonomic agents. The performance of the presented Multi-Agent Bounded Gain Forgetting (BGF) Composite Adaptive controller is compared against the tracking error criterion with a Feedback Linearization controller. By using the method, the sensor nodes move and reconfigure themselves in a coordinated way in response to a sensed environment. The multi-agent coordination is achieved through Centroidal Voronoi Tessellations and Coverage Control. Also, a consensus protocol is used for synchronization of the parameter vectors. The two controllers are given with their Lyapunov stability analysis and their stability is verified with simulation results. The simulations are carried out in MATLAB and ROS environments. Better performance is obtained with BGF Adaptive Controller.

Keywords : adaptive control, centroidal voronoi tessellations, composite adaptation, coordination, multi robots
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