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Multi-group flocking control of multi-agent systems

As a fascinating collective behavior, flocking is observed in a variety of biological species such as beasts, birds, fish, bees, and ants. In such situations, each individual acts as an autonomous agent and interacts only with its nearby neighbors, while the entire group displays coordinated behavior and can accomplish very complex tasks. Inspired by such collective intelligence of animal groups in nature, there has been an increased research interest in flocking control of multi-agent systems around the world in recent years. This talk discusses the flocking control problem of multi-agent systems with multi-group tracking various virtual leaders. Hybrid protocols are proposed to take into consideration of continuous communications among agents and intermittent information exchanges at a sequence of discrete times. It is shown, by employing results from graph theory and dynamical systems, that agents may be divided into multiple subgroups to follow different leaders while maintaining desired sub-formation configurations as well as collision-free motions.