

Safe online learning-based control of multi-agent systems with Gaussian processes

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Decentralized control algorithms for multi-agent systems have gained much attention in recent years due to the increasing amount of mobile and aerial robotic swarms. The design of safe controllers for these vehicles is a substantial aspect of an increasing range of application domains. However, parts of the vehicle's dynamics and external disturbances are often unknown or very time-consuming to model. To overcome this issue, I will present safe control laws for the formation and the flocking control of multiagent systems based on double integrator dynamics by using Gaussian Processes for on-line learning of the unknown dynamics. The presented approach guarantees a bounded error to exponentially achieve the desired coordination performances with high probability, where the bound are explicitly given.