Short_Abstract

The analysis and design of control strategies for the synchronization of subsystems that are coupled over communication networks is the topic of this thesis. Typically, synchronization problems deal with the asymptotic behavior of networked multi-agent systems, where it is required that the states of the subsystems follow a common trajectory as the time approaches infinity. In contrast, this thesis focuses on strategies that do not only fulfill the requirement on asymptotic synchronization but also requirements on the transient behavior of networked multi-agent systems. Motivated by a growing number of applications where subsystems exchange their information by means of modern communication systems, the limits on the achievable performance of synchronization are studied for large teams of autonomous subsystems. In particular, control strategies that do not require any centralized coordination of the subsystems are developed.