Hexacopter Outdoor Flight Test Results Using Adaptive Control Allocation Subject to an Unknown Complete Loss of One Propeller

This paper presents hexacopter outdoor flight test results using an adaptive control allocation subject to an unknown complete loss of one propeller. The proposed approach is composed of two main elements: The adaptive estimation of the control effectiveness of the propellers and the optimization based control allocation. The adaptive estimation is based on concurrent learning and the optimization is gradient based. The adaptive control allocation is able to deal with faults or failures in the propulsion system without reconfiguration of the controller. Simultaneously it is able to implement a degraded control strategy which prioritizes some control directions in case of extreme degradation.