INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

Control of unmanned aerial vehicles is very challenging due to their highly nonlinear dynamics and parameter variations with flight conditions. Several linear and nonlinear control techniques have been proposed in the literature for stabilization and tracking control of quadrotors. Most of the literature design the control laws using Euler angles or quaternions. To remove the singularities associated with Euler angles and ambiguities with quaternions, rotation matrices have been used to develop controllers in recent literature. Building upon these developments, the thesis attempts to develop globally valid control laws in the presence of disturbances and time-delays. The effect of external disturbances considered in the literature assumes that the bound on the disturbances is known a priori. Time delays are widespread in the physical systems and engineering domain. The literature on the control of quadrotors with input delay is very limited. Teleoperation is the next big thing in the robotics industry. It is quite desirable to be able to control a robotic device over a network with remote access. Almost all the literature on quadrotors does not consider communication time delay. The presence of communication time delay may result in instability in the system. Motivated by the current state of the literature, we propose to design a controller considering both inputs as well as state delay experienced while operating the device over a network.