Quadrotor in Horizontal Motion Control and Maneuverability

Authors : Ali Oveysi Sarabi

Abstract : In this paper, controller design for the attitude and altitude dynamics of an outdoor quadrotor, which is constructed with low cost actuators and drivers, is aimed. Before designing the controller, the quadrotor is modeled mathematically in Matlab-Simulink environment. To control attitude dynamics, linear quadratic regulator (LQR) based controllers are designed, simulated and applied to the system. Two different proportional-integral-derivative action (PID) controllers are designed to control yaw and altitude dynamics. During the implementation of the designed controllers, different test setups are used. Designed controllers are implemented and tuned on the real system using xPC Target. Tests show that these basic control structures are successful to control the attitude and altitude dynamics.

Keywords : helicopter balance, flight dynamics, autonomous landing, control robotics

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