

Sensor Fault Detection and Estimation for Quadrotors Using Kinematic Equations

This paper proposes a new method for detecting and estimating the faults in the sensors of quadrotor Unmanned Aerial Vehicles. The model used for the fault detection is the kinematic model of the quadrotors, which reduces the influence of model uncertainties. The faults in the sensors are modelled by a random walk process. The state vector of the Unscented Kalman Filter is augmented with the faults, which allows the faults to be estimated. The proposed approach is validated by two scenarios: in the presence and absence of sensor faults. Simulation result shows that the Augmented Unscented Kalman Filter can estimate both the state and faults well, which enables the quadrotor to maintain the flight even in the presence of sensor faults.