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Linear Quadratic Gaussian/Loop Transfer Recover Control Flight Control on a Nonlinear Model

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Abstract : As part of the development of a 4D autopilot system for unmanned aerial vehicles (UAVs), i.e. a time-dependent robust trajectory generation and control algorithm, this work addresses the problem of optimal path control based on the flight sensors data output that may be unreliable due to noise on data acquisition and/or transmission under certain circumstances. Although several filtering methods, such as the Kalman-Bucy filter or the Linear Quadratic Gaussian/Loop Transfer Recover Control (LQG/LTR), are available, the utter complexity of the control system, together with the robustness and reliability required of such a system on a UAV for airworthiness certifiable autonomous flight, required the development of a proper robust filter for a nonlinear system, as a way of further mitigate errors propagation to the control system and improve its ,performance. As such, a nonlinear algorithm based upon the LQG/LTR, is validated through computational simulation testing, is proposed on this paper.

Keywords : autonomous flight, LQG/LTR, nonlinear state estimator, robust flight control
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