

VIREO / Day10 / Flight17

TEST: Closed-loop control law validation. Disengaging pitch attitude controller.

RESULT: Good flight for control law validation.

EVENTS:

1. In this flight, the longitudinal controller (elevator only) was slowly turned off. The only controllers then running were the altitude tracker (using throttle) and the roll tracker and damper (using aileron). The goal was to see how the aircraft would behave if airspeed was not an explicitly controller variable.
2. First, θ_{cmd} (the output of the velocity tracker (VT)) was clamped to [5.9,6.1] degrees.
3. Next, the pitch damper was turned off, by setting k_{PD} to zero.
4. Finally, the elevator command from the pitch tracker was clamped to [-0.075, -0.065] radians.
5. The airspeed of the aircraft then began to deviate from its commanded value. The commanded (and trim) airspeed is 30 knots. The actual airspeed of the aircraft varied in the range [25,40] knots.
6. Squawk: The elevator command, despite being clamped to [-0.071, -0.069] radians, varied in the range of [-0.0530, -0.0509] radians. I am not sure why.