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CORRECTION

Correction to: Integrated Extremal Control and Explicit Guidance for Quadcopters

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Due to graduating and obtaining a job after graduation, the first author's affiliation has changed from the previous manuscript. Table 1 shows the previous and current affiliation of the first author.

Due to mixing time computations for position commands and real world clock time, figures 10, 11, 14, 18, 20, 21, 22, and 23 of Ref. [2] have the wrong times for the experimental and HITL data. Figures 1, 2, 3, 4, 5, 6, 7 and 8 of this corrigendum replace Figs. 10, 11, 14, 18, 20, 21, 22, and 23 of Ref. [2], respectively.

The PID controller finishes before the extremal controller (flight test and HITL) because the elapsed time in the DJI OSDK implementation was a counter for computing position commands instead of the real world clock time. Therefore, the PID controller has a higher average velocity of 2.5 m/s as it ascends to 20 m in approximately 8 seconds, while the extremal control has an average velocity of 0.71 m/s with an ascent time of 28 seconds (see Fig. 11 of Ref. [2]). Consequently, the PID velocity profile is significantly larger than the integrated extremal control and explicit guidance velocity. The PID velocity profile resembles a classic trapezoidal velocity profile for point to point maneuvers with max acceleration (max force), constant velocity, and then max deceleration [1, 3]. This typical approach is time optimal due to max acceleration and velocity but has discontinuous acceleration profiles [1]. Contrarily, the integrated extremal control and explicit guidance method presented here has continuous acceleration through E Guidance, which yields smoother profiles for velocity and position. Similar results occur for the waypoint guidance maneuver, but the real world clock time is 68 seconds.

The original article can be found online at https://doi.org/10.1007/s10846-020-01211-2.

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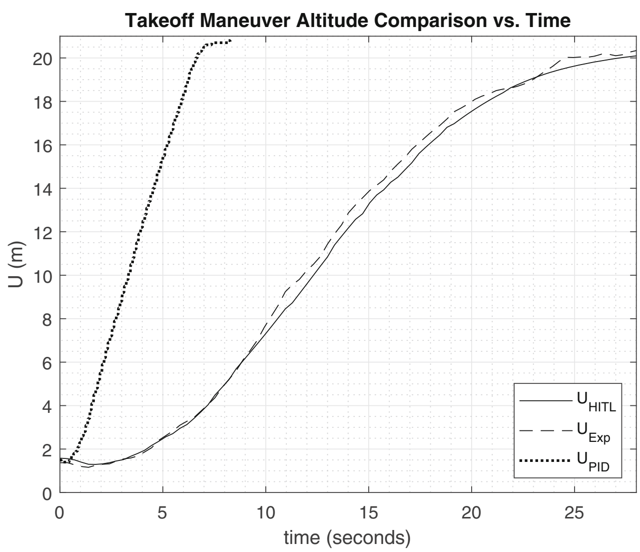


Fig. 1 Takeoff maneuver: Altitude comparison (replaces Fig. 10 of Ref. [2])

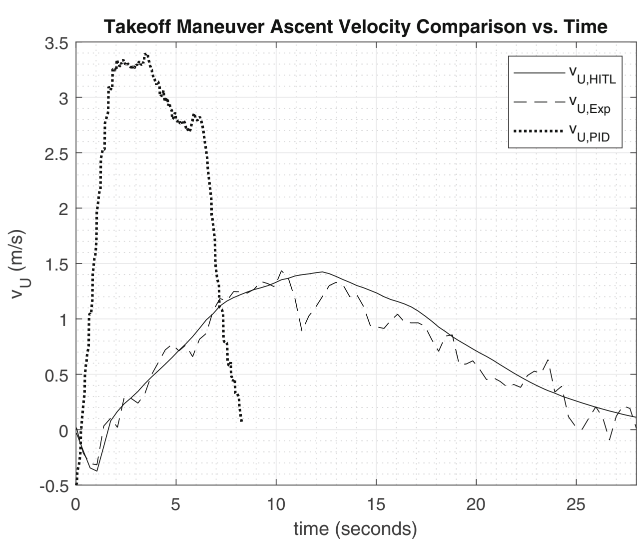


Fig. 2 Takeoff maneuver: Velocity comparison (replaces Fig. 11 of Ref. [2])

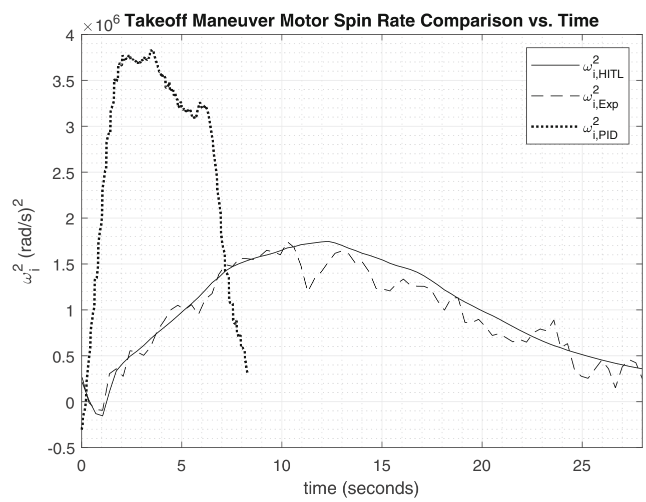
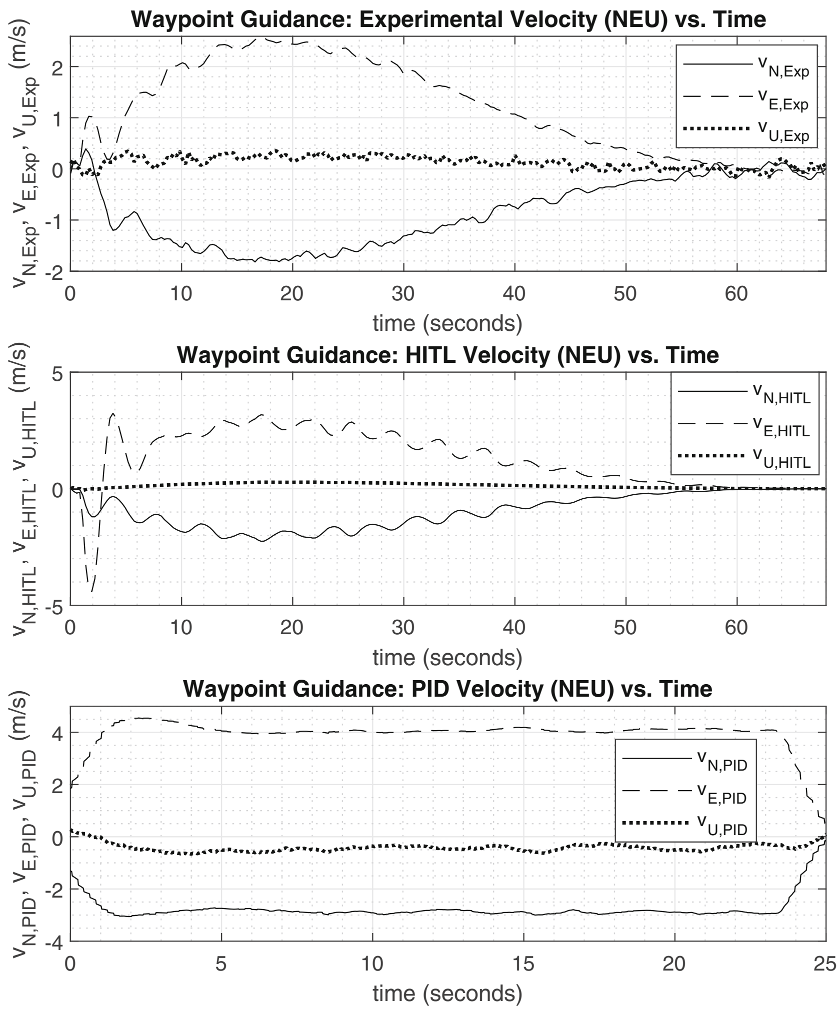


Fig. 3 Takeoff maneuver motor spin rate comparison (replaces Fig. 14 of Ref. [2])

Fig. 4 Waypoint guidance: Experimental, HITL, & PID velocity comparison vs. Time (replaces Fig. 18 of Ref. [2])



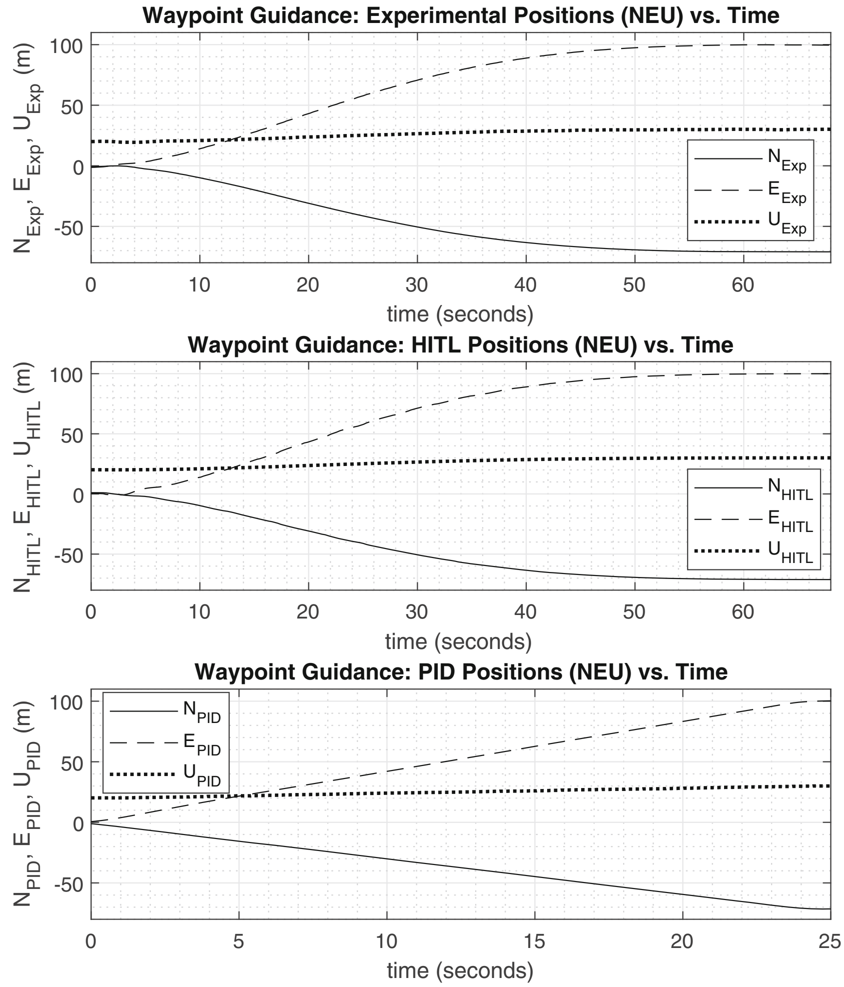


Fig. 5 Waypoint guidance: Experimental, HITL, & PID position comparison vs. Time (replaces Fig. 20 of Ref. [2])

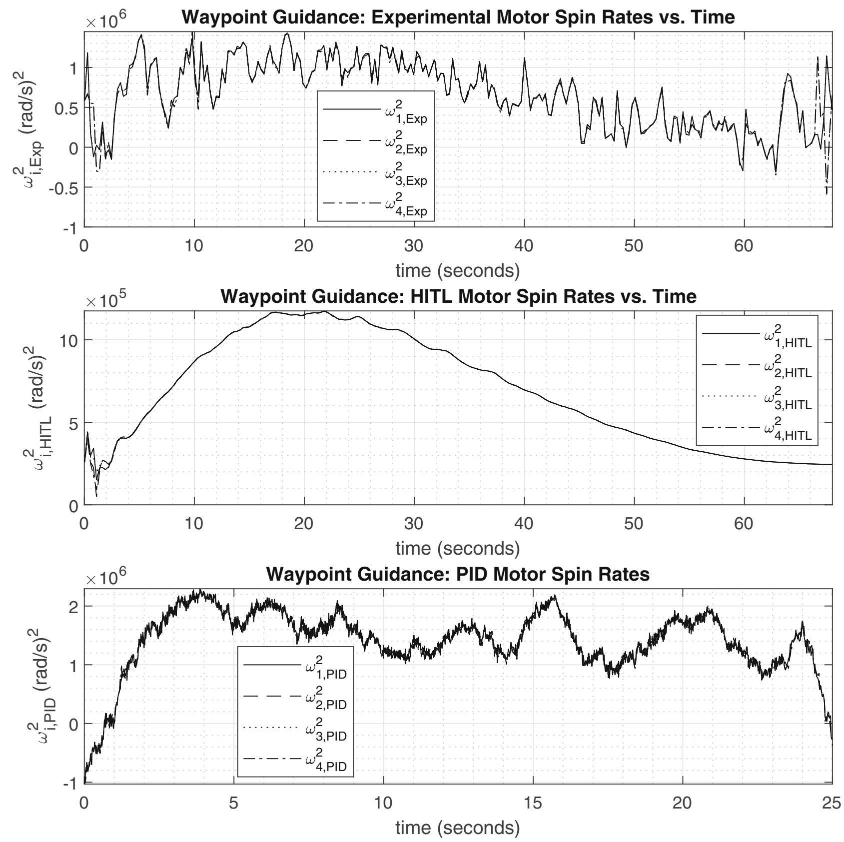


Fig. 6 Waypoint guidance experimental, HITL, & PID motor spin rate comparison vs. Time (replaces Fig. 21 of Ref. [2])

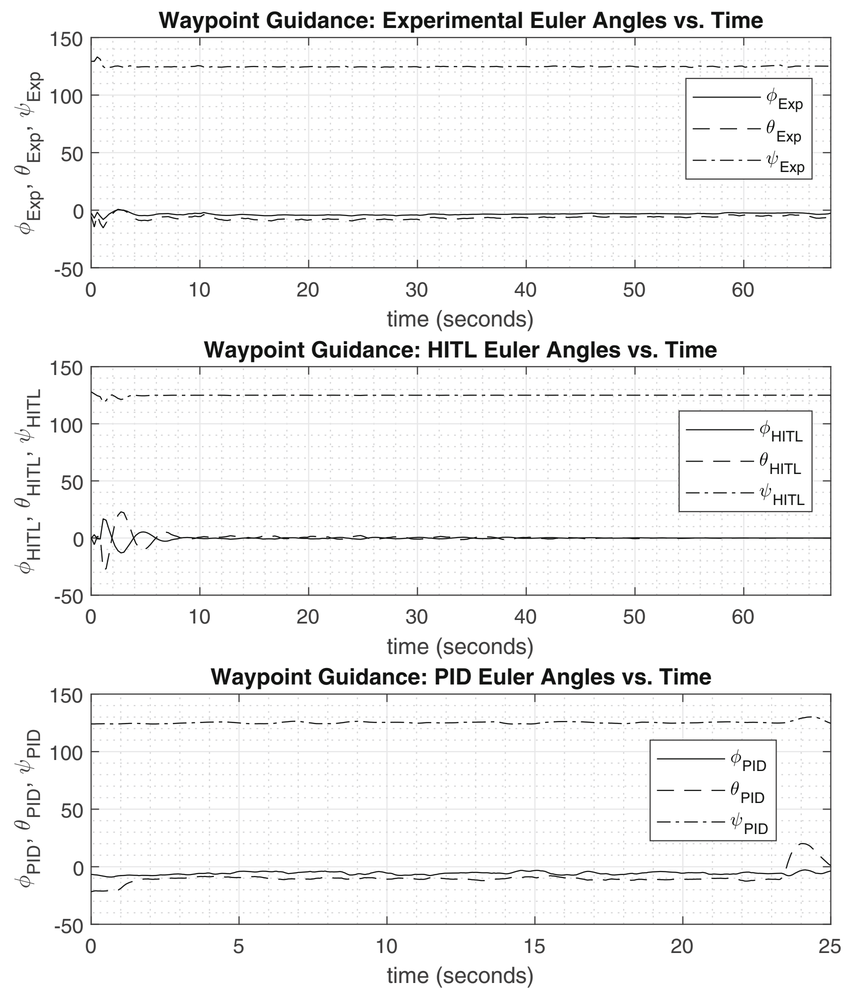


Fig. 7 Waypoint guidance: E guidance & PID euler angles comparison vs. Time (replaces Fig. 22 of Ref. [2])

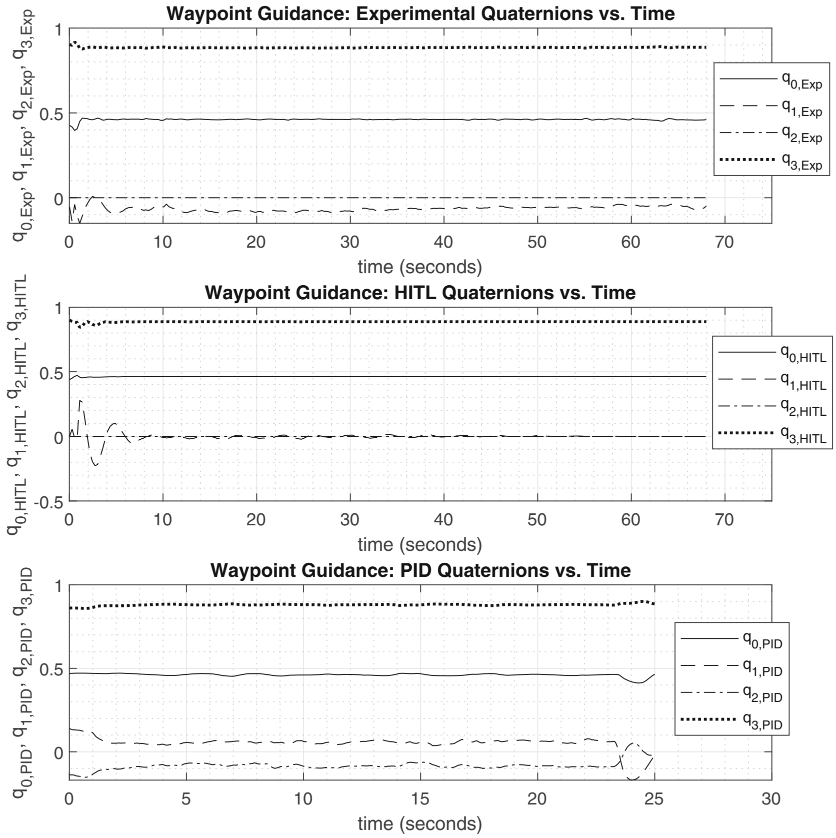


Fig. 8 Waypoint guidance: E guidance & PID quaternion comparison vs. Time (replaces Fig. 23 of Ref. [2])

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References

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