

Response to the reviewers comments

Manuscript reference: #6349

Title: Robust backstepping control for highly demanding quadrotor flight

Authors: Manuel Alejandro Vallejo-Alarcón, Martín Velasco-Villa,
and Rafael Castro-Linares

We would like to thank the reviewers for their valuable observations that allow us to improve the work. The suggestions have been addressed as follows:

1. **Before eq. (3), reformulate as follows: Based on the nonlinear dynamic inversion approach, the following preliminary inputs...**

We appreciate the suggestion. The suggested change has been addressed.

2. **Before the title of Section 3, instead of W^{-1} , I suggest to write W^T ; of course, being a rotational matrix they coincide but it is a question of using less notations;**

The matrix W could appear to be a rotational matrix, but it is not, and its inverse does not match its transpose.

3. **The implementation of the true commands using (3) require an accurate knowledge of all coefficients arising in eq. (3); Some comments on this and on possible saturation due to small values of $\cos\theta \cos\phi$, could be of interest, even by considering such cases in the numerical simulations**

Inaccurate values for J and m would lead to inexact cancellations, this would add some perturbation terms to (4) that could be included in the perturbations already expressed; now, this is commented in the paragraph after (3).

As the design of the controller does not limit the action of the desired trajectories, those desired trajectories must be elected such that the actuators do not reach saturation levels just by tracking the trajectory, as it is pointed out in Remark 4; now, this remark also gives more information about the desired trajectory design. Also, some implemented safety features to not reach saturation due to small values of $\cos\theta \cos\phi$ are now presented in the paragraph after Assumption 1.