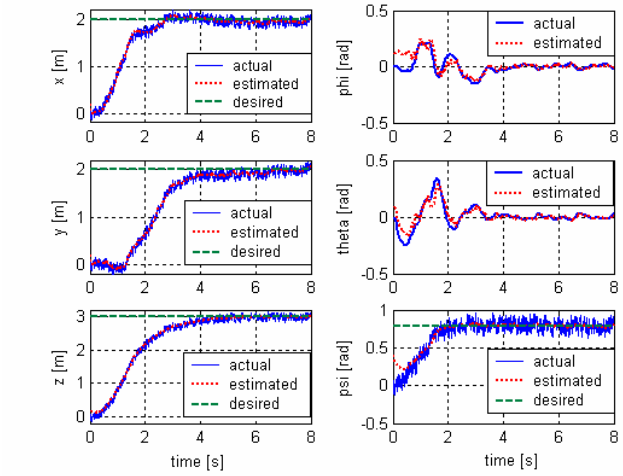

Fig. 3. Actual position and orientation and their estimates.

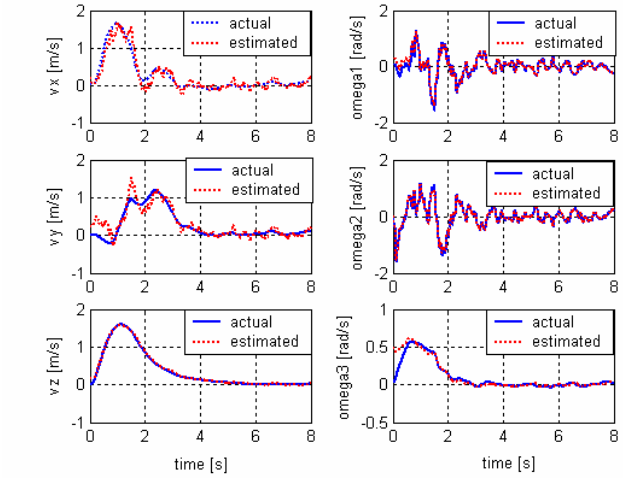

Fig. 4. Actual velocities and their estimates.

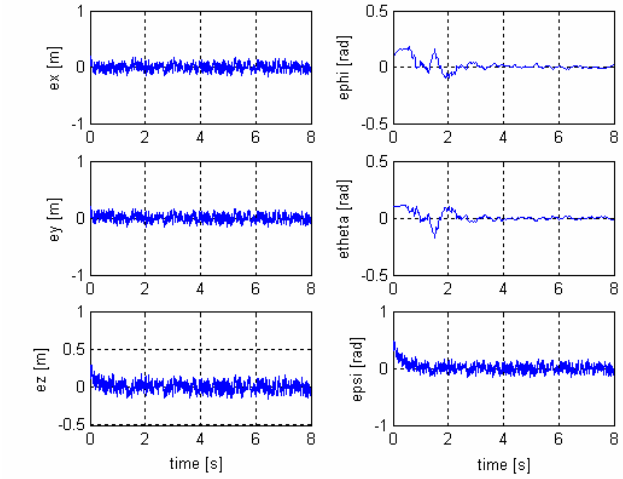

Fig. 5. Estimation error according position and orientation.

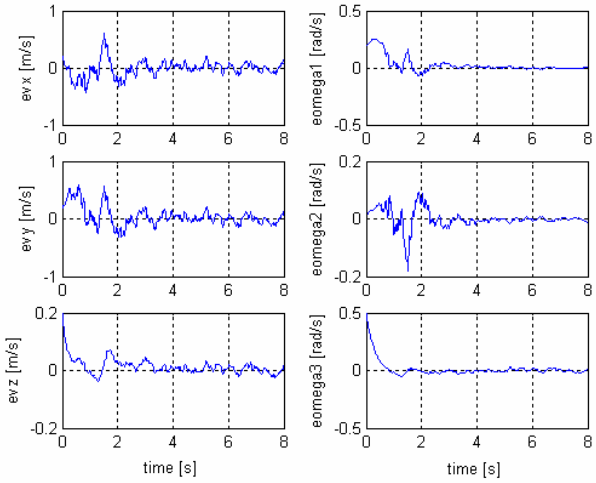

Fig. 6. Estimation error according velocities.

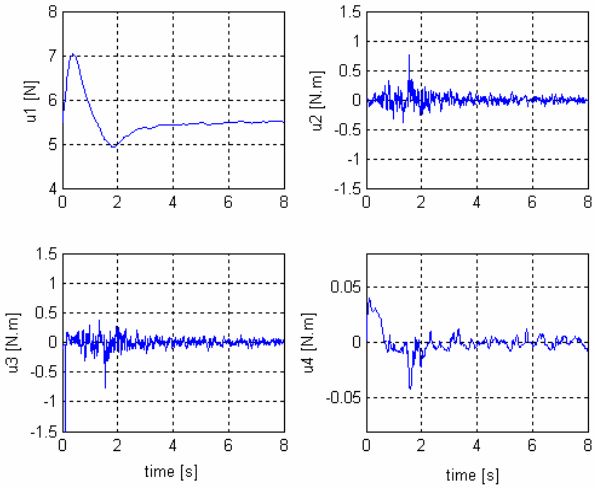

Fig. 7. Control inputs.

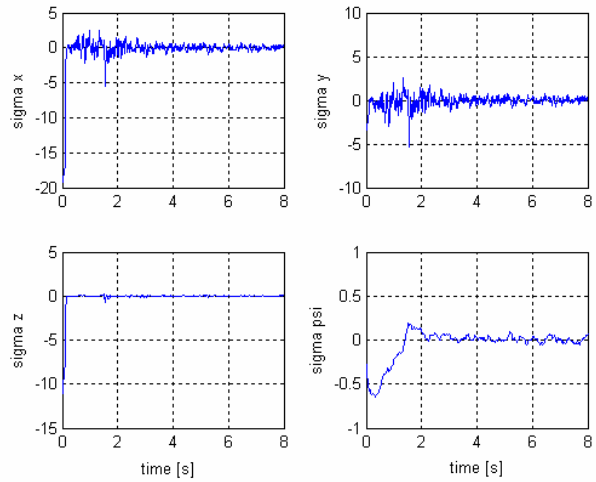

Fig. 8. Sliding surfaces.

7. CONCLUSIONS

In this paper, we have proposed a dynamic feedback controller using a state observer for a quadrotor helicopter. The proposed solution is based on a combination of a high gain observer and a dynamic feedback sliding mode controller. Sufficient conditions have been stated such that a kind of separation principle holds. We have shown the asymptotic stability of the global closed loop system using Lyapunov analysis. The unmeasured states have been successfully reconstructed through the observer even when the output measurements are noisy. Simulation results show the effectiveness of the proposed observer–based control. In future work, we will implement the control law on a real quadrotor helicopter.

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