PD-Computed Torque Control for an Autonomous Airship

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Abstract (300 word limit)

For the trajectory following problem of an airship, the standard computed torque control law is shown to be robust with respect to unknown dynamics by judiciously choosing the feedback gains and the estimates of the nonlinear dynamics. In the first part of this paper, kinematics and dynamics modeling of the airships is presented. Euler angles and parameters are used in the formulation of this model and the technique of Computed Torque control is introduced. In the second part of the paper, we develop a methodology of control that allows the airship to accomplish a prospecting mission of an environment, as the follow-up of a trajectory by the simulation who results show that Computed Torque control method is suitable for airships.

Image

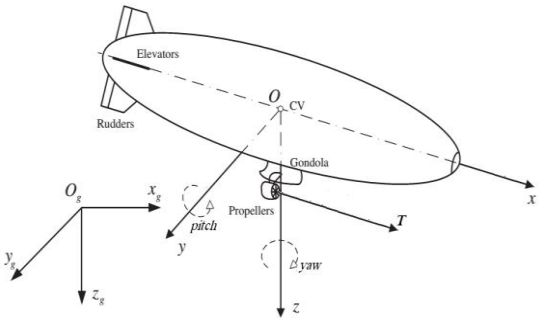


Fig. 1. Structure of the Airship

Recent Publications

1. Y. Meddahi, K. Zemalache Meguenni, M. Tahar, M. A. Larbi "A Backstepping Approach for Airship Autonomous Robust Control", International Review of Automatic Control, (IREACO), Vol. 6, no. 6, November 2013.
2. Y. Meddahi, K. Zemalache Meguenni, M. Tahar, M. A. Larbi "The Force Estimator Designed and the PI-Backstepping Applied for the UAVS Type Airship", International Journal of Automation and Computing, (IJAC), 2014.
3. M. A. Larbi, K. Zemalache Meguenni, Y. Meddahi, M. Litim, "Nonlinear Observer and Backstepping Control ofQuadrotor Unmanned Aerial Vehicle". International Review of Automatic Control, (IREACO), Vol. 6, no. 5, September 2013.
4. Y. Meddahi, K. Zemalache Meguenni, M. A. Larbi, M. Litim, "A PI/Backstepping Approach for Airship Autonomous Type", 5th International Conference on ELectrotechnics, ICEL'13.
5. Y. Meddahi, K. Zemalache Meguenni, M. A. Larbi, M. Litim, " Integral Backstepping Controller for an Autonomous Airship", 6th Seminar On Detection Systems: Architectures and Technologies, Feb 17th-19th,2014 in Algiers,DAT'2014.
6. Y. Meddahi, K. Zemalache Meguenni, M. A. Larbi, M. Litim, " UAV Controller Design and Analysis Using Backstepping Control", 2ere Conférence Internationale Sur l'Electronique, l'Electrotechnique et l'Automatique CIEEA'13, Oran le 26 & 27 Novembre 2013.
7. M. A. Larbi, K. Zemalache Meguenni, Y. Meddahi, M. Litim, "Observer Design, with BacksteppingController for a Four Rotor UAV". InternationalConferenceon Electrical Engineering and Automatic Control, Setif, 24-26 November 2013.
8. M. A. Larbi, K. Zemalache Meguenni, Y. Meddahi, M. Litim, "The Observer Design, with Backstepping Controller for stabilizing a Quadrotor UAV". 6th Seminar on Detection Systems: Architectures and Technologies, Feb 17th-19th, 2014 in Algiers, DAT'2014.

Photograph



Biography

Meddahi Youssouf received the PHD Degree in Electrical Engineering from University of Sciences and Technology of Oran M-B (USTO), Algeria, in 2015.His research interests include nonlinear control of mechanical systems, and control system analysis and design tools for under-actuated systems with applications to aerospace vehicles.

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Notes/Comment