

Nonlinear Visual Servoing Control for VTOL UAVs with Field of View Constraint

This paper proposes a new nonlinear visual servoing control law for Vertical Take-Off and Landing (VTOL) Unmanned Aerial Vehicles (UAVs) which forces the observed target to be maintained inside the videocamera field of view. The considered vehicles are underactuated - there are less control inputs than degrees of freedom- and the control task is performed in a minimal sensors configuration, where only images from a videocamera, inertial and linear velocity measurements are available. An input saturation technique is applied to a recently defined nonlinear control design for vision based UAV stabilization, which forces the target to remain in view of the UAV during the flight, instead of assuming that this property will be true, as most existing approaches do. A stability analysis of the obtained closed-loop is presented. Simulation results show the relevance of the proposed approach.