

Abstract Submitted
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Unmanned Aerial Systems Guidance and Control Utilizing Instantaneous Screw Motion Invariants JASUR ABDINABIEV, DILMURAT AZIMOV, University of Hawaii at Manoa — The purpose of this research is to study the application of the concept of instantaneous screw motion (ISM) to unmanned aerial vehicle (UAV) dynamics, guidance, and control. The proposed approach to the utilization of this concept in flight dynamics is based on the ISM invariants. The equations of motion of the instantaneous screw axis (ISA) are presented. Thrust and angle of attack are considered as the control parameters. The motion invariants are determined in terms of the traditional kinematic and dynamic parameters by using the dynamic models of a quadcopter and a fixed-wing aircraft. The profiles of the invariants for various maneuvers of the UAVs are determined in terms of time and control parameters. Various characteristics of the ISM invariants and their profiles have been explained. Illustrative examples of utilizing these invariants in the analyses of motion dynamics and control are presented.

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