
A Framework for Generating Advisory Control Actions for Pilot Decision Support under Control Surface Faults

Résumé

This paper presents a novel framework for generating advisory control actions to enhance pilot decision support during degraded flight conditions caused by control surface faults. The proposed framework provides a proactive assessment of system operability. By leveraging finite-horizon recoverability metrics within a hybrid mode-reference space, the approach predicts mode-dependent closed-loop dynamics to identify, filter, and rank mode-management strategies and control options that preserve operation within a degraded flight envelope. Validated using the NASA Generic Transport Model (GTM), the results demonstrate a robust capacity to generate actionable, real-time guidance that effectively distinguishes between safe and hazardous control trajectories.