

## **Flexible Launch Vehicle Control using Robust Observer-based Controller Obtained through Structured H-infinity Synthesis**

Control of a flexible launch vehicle in the atmospheric ascent phase is highly challenging as it involves multiple concurrent design requirements. This ranges from reduction of the angle of attack in face of wind, minimum gain-phase and parametric margins as well as flexible modes attenuation. In this work, we discuss recently available non-smooth optimization techniques as a central tool to solve this problem. We consider designing an observer-based controller based on a Kalman filter suitably augmented with Dryden wind dynamics. We suggest a nonconservative approach to handle model uncertainties based upon multiple models of the launcher. This preliminary work aims at testing the potential of non-smooth controller tuning on a generic launcher model. It will serve as a stepping stone for a more in-depth study of the benchmark developed by M. Ganet at Airbus Defence and Space.