Fault Detection and Isolation of a Cryogenic Rocket Engine using a Parity Space Approach

Paul van Gelder, Johann Keppeler, Serge le Gonidec

***Abstract*—This paper presents a parity space (PS) approach for fault detection and isolation (FDI) of a cryogenic rocket engine. Nominal and non-nominal simulation data for three engine set points have been provided. The PS approach uses three measurements to generate residuals and a spherical transformation to map these residuals to faults. The radial co-ordinate is used for fault detection whereas the azimuthal and polar co-ordinates are used for fault isolation. The approach is tested and compared with other FDI approaches. Evaluation criteria are missed alarms, false alarms, and fault detection time. Although the approach needs a different residual generation method to become more robust, it works very well when compared with the other FDI approaches.**

***Index Terms*—Fault Detection, Fault Isolation, Fault Diagnosis, Parity Space, Rocket Engine.**

I. Introduction