

Fault tolerant control with respect to actuator failures Application to steam generator process

A. Aïtouche^a and B. Ould Bouamama^b

^aLAGIS UMR CNRS 8146, ERASM-HEI

13, rue de Toul, 59046 Lille Cedex, France

^bLAGIS UMR CNRS 8146, Polytech'Lille

Cité scientifique, 59655 Villeneuve d'Ascq, France

Abstract

This paper deals with the analysis of nonlinear reachability and fault tolerant properties of multiactuator nonlinear systems. In this case, the process is a steam generator process containing a set of actuators. After occurrence of one or several actuator faults detected and isolated by Fault Detection and Isolation (FDI) approaches, a quantitative analysis of the faulty system properties helps us to determine whether the faulty system can go on operating or not. Nonlinear reachability analysis that has been presented in this paper allows us to determine the minimal number of actuators that are necessary to keep the system under control.

Keywords: Fault Detection and Isolation, Fault Tolerant Control, nonlinear reachability, actuator failures, steam generator process.