Abstract

System reliability has become one of the major concerns on industrial systems survey in order to guarantee a system lifecycle far from malfunctions, disturbances and dangers. In this context, Fault Tolerant Control systems are involved in automation engineering issues as a remedy to system reliability troubles. Thereby, we deal in this paper with a graphical Active Fault Tolerant Control (AFTC) law that compensates actuator fault effects, guarantees desirable closed-loop performances and system resilience. This tolerant control law is based on a linear Bond Graph (BG) adaptive observer to detect and estimate failures. This control framework and the adaptive observer are designed by a graphical concept using Bond Graph tool as a useful methodology for multidisciplinary systems and which is based on structural, causal and behavioural properties. To emphasis proposed controller efficiency, an hydraulic system with two tanks is modelled and controlled with and without fault scenarios.

References

Index Terms

Computer Science
Control Systems

Keywords

Bond Graph, Adaptive observer, Fault detection and estimation, Active Fault Tolerant Control, Feedforward control