ESISAR AC 514
Département : AUTOMATIQUE
Damien KOENIG
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TP 2: ROBUST ACTUATOR FAULT DETECTION AND ISOLATION

1 PARITY SPACE APPROACH

Consider the following linear time invariant system

$$\begin{aligned} \dot{x} &= Ax + B\left(u + f_a\right) + Ed \\ y &= Cx \end{aligned} \tag{1}$$

$$A = \begin{bmatrix} -1 & 0 & 0 \\ 1 & -1 & 1 \\ 0 & 1 & -2 \end{bmatrix},\ B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \end{bmatrix},\ E = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} \text{ et C=I}$$

where d is an additive disturbance and f_a the potential fault actuator. All matrices are known with appropriate dimensions.

In order to detect and isolate the fault actuator, we will satisfy the following table decision

	r^1	r^2	Fault alarm
f_{a1}	1	0	a_1=1 if f_{a1} hold true $\forall$ f_{a2} and d
f_{a2}	0	1	a_2=1 if f_{a2} hold true $\forall$ f_{a1} and d
d	0	0	

Table 1

1. Give the two-parity relation which satisfy table 1.
2. Design by Simulink software the scheme solution of this diagnosis problem.
3. Check in simulink the sensibility given by the table 1.
4. Conclusion