Model Documentation of the 'Leteral axis dynamic for a L-1011 aircraft'

1 Nomenclature

1.1 Nomenclature for Model Equations

x	state vector
u	control input vector
w	noise vector
z	regulated output vector
y	measurement vector

2 Model Equations

State Vector and Input Vector:

$$x \in \mathbb{R}^4 u \qquad \in \mathbb{R}^1 w \in \mathbb{R}^4 z \qquad \in \mathbb{R}^4 y \in \mathbb{R}^2$$

System Equations:

$$\dot{x}(t) = Ax(t) + B_1 w(t) + Bu(t) \tag{1a}$$
$$z(t) = C_1 x(t) + D_{11} w(t) + D12u(t) \tag{1b}$$
$$y(t) = Cx(t) + D21w(t) \tag{1c}$$

Outputs: z

2.1 Exemplary parameter values

Symbol	Value
A	$\begin{bmatrix} -2.98 & 0.93 & 0 & -0.034 \\ -0.99 & -0.21 & 0.035 & -0.0011 \\ 0 & 0 & 0 & 1.0 \\ 0.39 & -5.555 & 0 & -1.89 \end{bmatrix}$
B	$\begin{bmatrix} -0.032 \\ 0 \\ 0 \\ -1.6 \end{bmatrix}$
B_1	$\begin{bmatrix} -0.032 \\ 0 \\ 0 \\ -1.6 \end{bmatrix}$
C_1	$\begin{bmatrix} 1.0 & 0 & 0 & 0 \\ 0 & 1.0 & 0 & 0 \\ 0 & 0 & 1.0 & 0 \\ 0 & 0 & 0 & 1.0 \end{bmatrix}$
C	$\begin{bmatrix} 0 & 0 & 1.0 & 0 \\ 0 & 0 & 0 & 1.0 \end{bmatrix}$
D_{11}	$\begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$
D_{12}	$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 1.0 \end{bmatrix}$
D_{21}	$\begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

3 Derivation and Explanation

This model is part of the "'COMPleib"' - library and wasautomatically imported into ACKREP.
The original description was:
AC17 Leteral axis dynamic for a L-1011 aircraft A. R. Galimidi and B. R. Bramish "The constrained Lyapunov problem and its application to robust output feedback stabilization" TOAC Vol. 31,Nr. 5, pp.410-419, 1986

4 Simulation

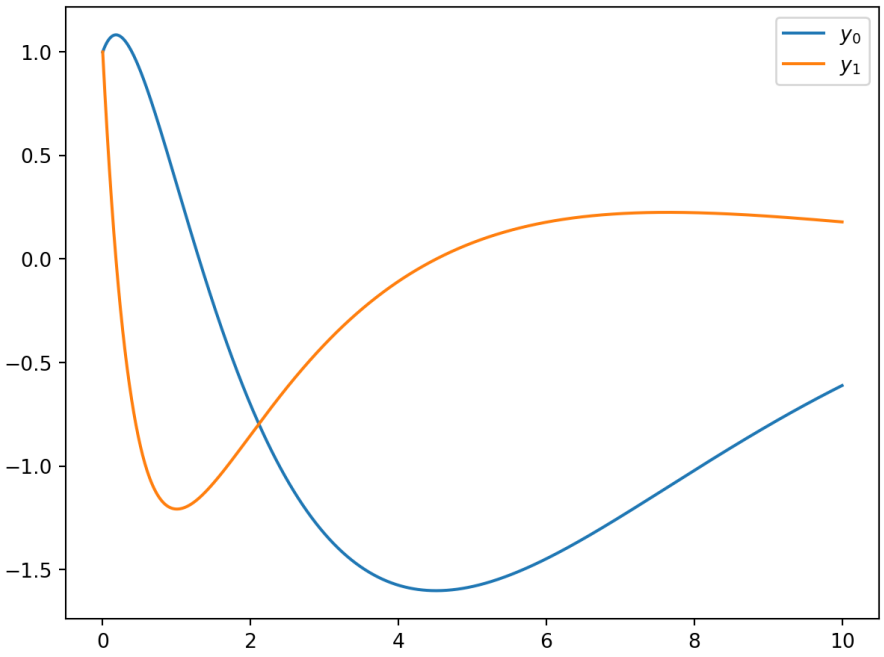

Figure 1: Simulation of the Leteral axis dynamic for a L-1011 aircraft.

References

[1] . R. Galimidi and B. R. Bramish "The constrained Lyapunov problem and its application to robust output feedback stabilization" TOAC Vol. 31,Nr. 5, pp.410-419, 1986