Model Documentation of the 'AC1'

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:

$$x \in \mathbb{R}^5 u \qquad \in \mathbb{R}^3 w \in \mathbb{R}^3 z \qquad \in \mathbb{R}^5 y \in \mathbb{R}^3$$

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	$\begin{bmatrix} 0 & 0 & 1.132 & 0 & -1.0 \\ 0 & -0.0538 & -0.1712 & 0 & 0.0705 \\ 0 & 0 & 0 & 1.0 & 0 \\ 0 & 0.0485 & 0 & -0.8556 & -1.013 \\ 0 & -0.2909 & 0 & 1.0532 & -0.6859 \end{bmatrix}$
B	$\begin{bmatrix} 0 & 0 & 0 \\ -0.12 & 1.0 & 0 \\ 0 & 0 & 0 \\ 4.419 & 0 & -1.665 \\ 1.575 & 0 & -0.0732 \end{bmatrix}$
B_1	$\begin{bmatrix} 0 & 0 & 0 \\ -0.12 & 1.0 & 0 \\ 0 & 0 & 0 \\ 4.419 & 0 & -1.665 \\ 1.575 & 0 & -0.0732 \end{bmatrix}$
C_1	$\begin{bmatrix} 0 & 0.70710678 & 0 & 0 & 0 \\ 0 & 0 & 0.70710678 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
C	$\begin{bmatrix} 1.0 & 0 & 0 & 0 & 0 \\ 0 & 1.0 & 0 & 0 & 0 \\ 0 & 0 & 1.0 & 0 & 0 \end{bmatrix}$
D_{11}	$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$
D_{12}	$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0.70710678 & 0 & 0 \\ 0 & 0.70710678 & 0 \\ 0 & 0 & 0.70710678 \end{bmatrix}$
D_{21}	$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

3 Derivation and Explanation

This model is part of the "'COMPleib"' - library and wasautomatically imported into ACKREP.
The original description was:
AC2 like AC1 with changed C1, D11, D12

4 Simulation

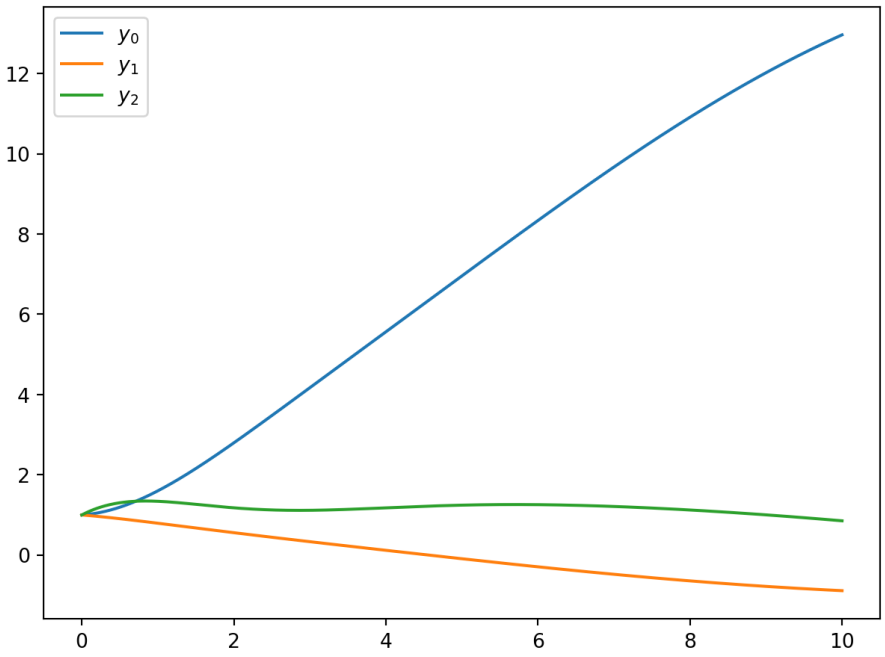

Figure 1: Simulation of the AC1.

References

[1] . S. Hung and A. G. J. MacFarlane, "Multivariable feedback A quasi–classical approach", Springer-Verlag, "Lecture Notes in Control and Information Sciences", 1982