

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:

$$x \in \mathbb{R}^5 \quad u \in \mathbb{R}^3 \quad w \in \mathbb{R}^3 \quad z \in \mathbb{R}^2 \quad y \in \mathbb{R}^3$$

System Equations:

$$\dot{x}(t) = Ax(t) + B_1w(t) + Bu(t) \tag{1a}$$

$$z(t) = C_1x(t) + D_{11}w(t) + D_{12}u(t) \tag{1b}$$

$$y(t) = Cx(t) + D_{21}w(t) \tag{1c}$$

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	$\begin{bmatrix} 0 & 0.70710678 & 0 & 0 & 0 \\ 0 & 0 & 0.70710678 & 0 & 0 \end{bmatrix}$
				C
D_{11}			$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$	
	D_{12}		$\begin{bmatrix} 0.70710678 & 0 & 0 \\ 0 & 0.70710678 & 0 \end{bmatrix}$	
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 was automatically imported into ACKREP.

The original description was:

AC1 Y. S. Hung and A. G. J. MacFarlane, "Multivariable feedback A quasi-classical approach", Springer-Verlag, "Lecture Notes in Control and Information Sciences", 1982

4 Simulation

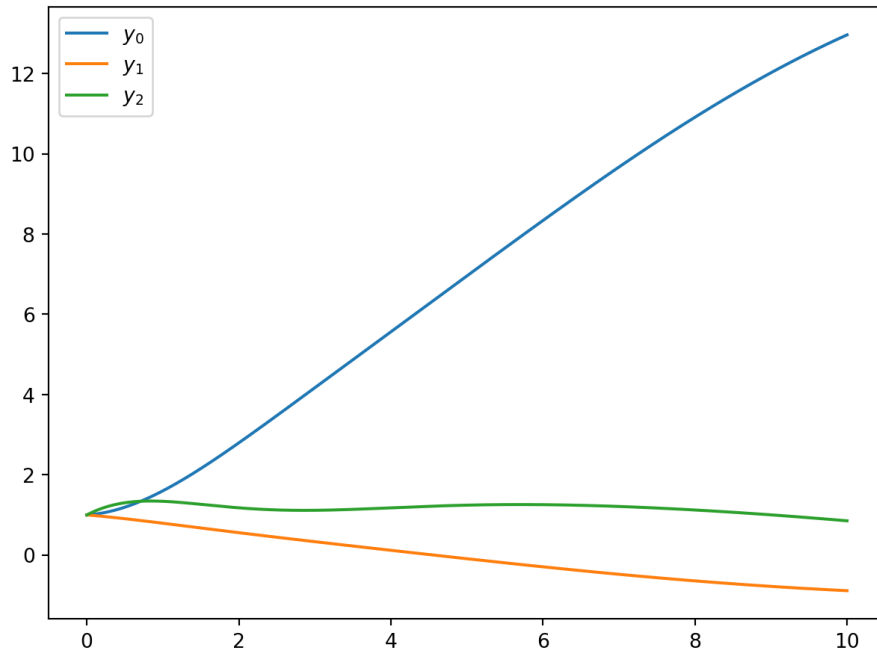


Figure 1: Simulation of the AC1.

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