Model Documentation of the 'Decentralized system with 2 control stations'

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:

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

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	$\begin{bmatrix} -4.0 & 2.0 & 1.0 \\ 3.0 & -2.0 & 5.0 \\ -7.0 & 0 & 3.0 \end{bmatrix}$
B	$\begin{bmatrix} 1.0 & 0 \\ 1.0 & 0 \\ 0 & 1.0 \end{bmatrix}$
B_1	$\begin{bmatrix} 1.0 & 0 \\ 1.0 & 0 \\ 0 & 1.0 \end{bmatrix}$
C_1	$\begin{bmatrix} 1.0 & 0 & 0 \\ 0 & 1.0 & 0 \\ 0 & 0 & 1.0 \end{bmatrix}$
C	$\begin{bmatrix} 0 & 1.0 & 0 \\ 0 & 0 & 1.0 \end{bmatrix}$
D_{11}	$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$
D_{12}	$\begin{bmatrix} 0 & 0 \\ 1.0 & 0 \\ 0 & 1.0 \end{bmatrix}$
D_{21}	$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

3 Derivation and Explanation

This model is part of the "'COMPleib"' - library and wasautomatically imported into ACKREP.
The original description was:
DIS2 Decentralized system with 2 control stations W. Q. Liu and V. Sreeram, "New Algorithm for Computing LQ Suboptimal Output Feedback Gains of Decentralized Control Systems", JOTA, Vol. 93

4 Simulation

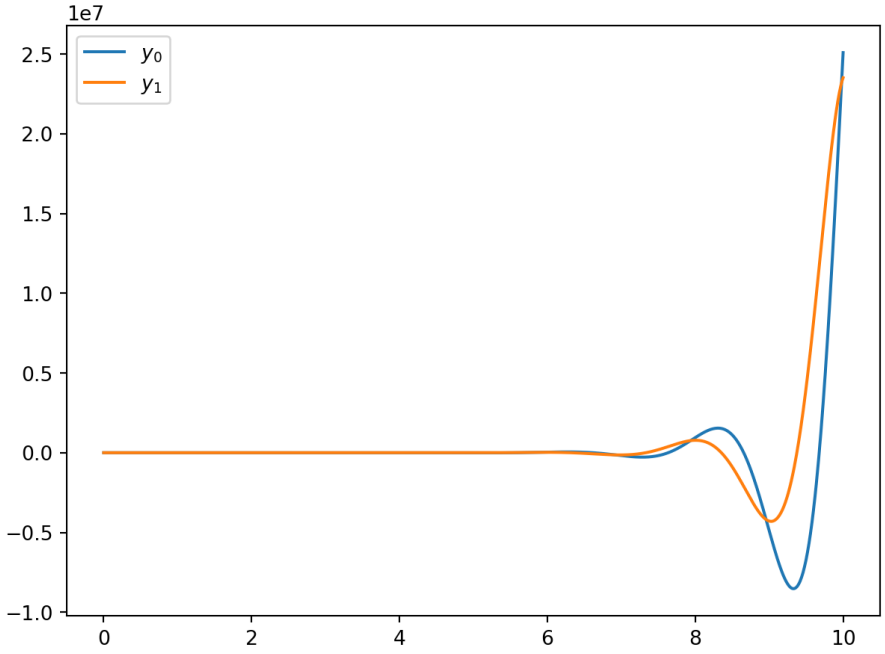

Figure 1: Simulation of the Decentralized system with 2 control stations.

References

[1] . Q. Liu and V. Sreeram, "New Algorithm for Computing LQ Suboptimal Output Feedback Gains of Decentralized Control Systems", JOTA, Vol. 93