Model Documentation of the 'Aero engine control'

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:

$$x \in \mathbb{R}^2 1u \qquad \in \mathbb{R}^3 w \in \mathbb{R}^2 1z \qquad \in \mathbb{R}^2 1y \in \mathbb{R}^3$$

System Equations:

$$\dot{x}(t) = Ax(t) + B_1 w(t) + Bu(t) \tag{1a}$$

$$z(t) = C_1 x(t) + D_{11} w(t) + D12 u(t) \tag{1b}$$

$$y(t) = Cx(t) + D21 w(t) \tag{1c}$$

Outputs: z

2.1 Exemplary parameter values

Parameters omitted due to large matrizes. See Source code.

3 Derivation and Explanation

This model is part of the "'COMPleib"' - library and wasautomatically imported into ACKREP.
The original description was:
JE2 Aero engine control "Multivariable feedback control Analysis and design"
S. Skogestad and I. Postlethwaite John Wiley and Sons, 1996, Section 12.3.3
Note Matlab files http//www.nt.ntnu.no/users/skoge/book/matlab.html stored
in /export/home/leibfr/Lipinski/matlab/.. ..Examples_Multi_Feedback_Control/matlab_m/
F. Leibfritz, 16.09.2003 Data matrices generated by Sec12_33.m in directory
above on Laptop save Aero_Engine a b c d A_Hinf B1 B2 C1 C2 D11 D12
D21 D22 a b c d – data set G5 ==> [a,b,c,d]=unpckW2GWpbar F. Leibfritz,
07.03.2005 renamed to A_je2=a B_je2=b C_je2=c D_je2=d
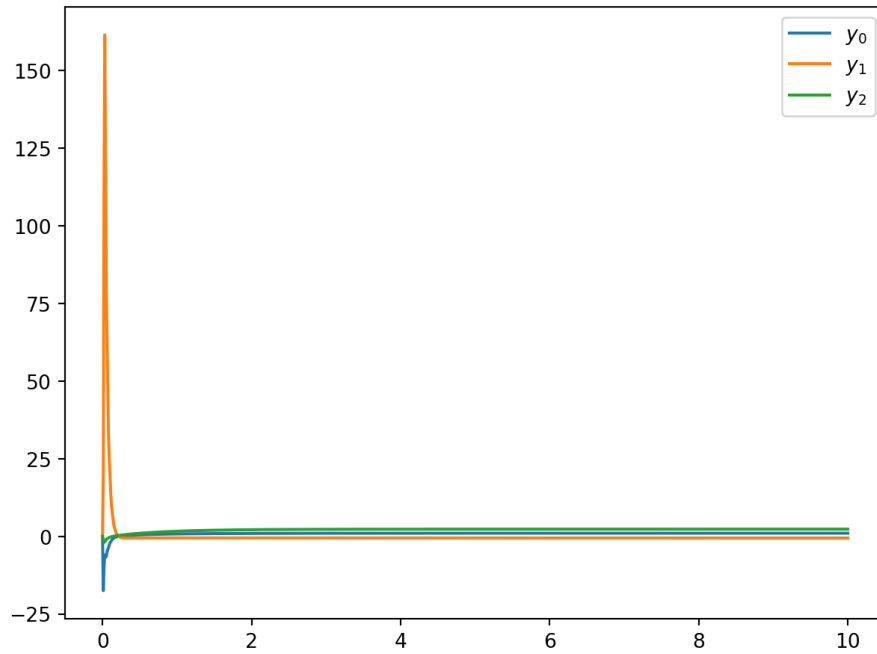
4 Simulation

Figure 1: Simulation of the Aero engine control.

References

[1] Multivariable feedback control Analysis and design" S. Skogestad and I. Postlethwaite John Wiley and Sons, 1996, Section 12.3.3