Model Documentation of the 'Coupled spring experiment, l=30 2nd order system'

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:

$$x \in \mathbb{R}^6 0u \qquad \in \mathbb{R}^2 w \in \mathbb{R}^1 z \qquad \in \mathbb{R}^3 2y \in \mathbb{R}^3 0$$

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

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:
CSE2 Coupled spring experiment, l=30 2nd order system J. Abels and P. Benner, "CAREX - A Collection of Benchmark Examples for Continuous-Time Algebraic Riccati Equations Version 2.0", SLICOT Working Note 1999-14, Ex. 4.3 available via ftp wgs.esat.kuleuven.ac.be/ pub/WGS/REPORTS/SLWN1999-14.ps.Z",

4 Simulation

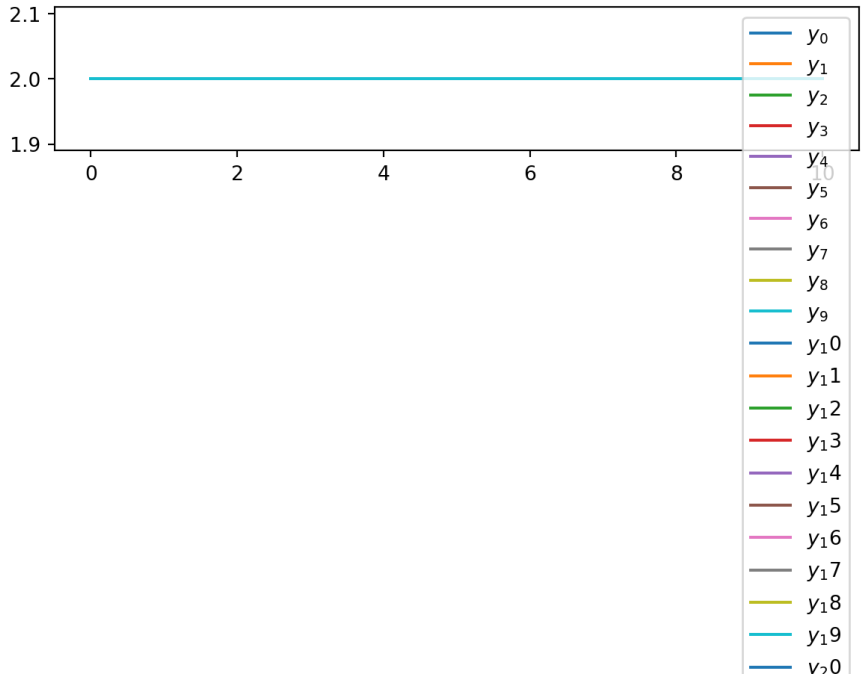

Figure 1: Simulation of the Coupled spring experiment, l=30 2nd order system.

References

[1] . Abels and P. Benner, "CAREX - A Collection of Benchmark Examples for Continuous-Time Algebraic Riccati Equations Version 2.0", SLICOT Working Note 1999-14, Ex. 4.3 available via ftp wgs.esat.kuleuven.ac.be/ pub/WGS/REPORTS/SLWN1999-14.ps.Z",