

# Model Documentation of the 'Linear cable mass problem of order 20'

## 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:

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

System Equations:

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

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

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

Outputs:  $z$

### 2.1 Exemplary parameter values

Parameters omitted due to large matrices. See Source code.

## 3 Derivation and Explanation

This model is part of the "COMpleib" - library and was automatically imported into ACKREP.

The original description was:

CM2 To CM1 corresponding example of order 60.

## 4 Simulation

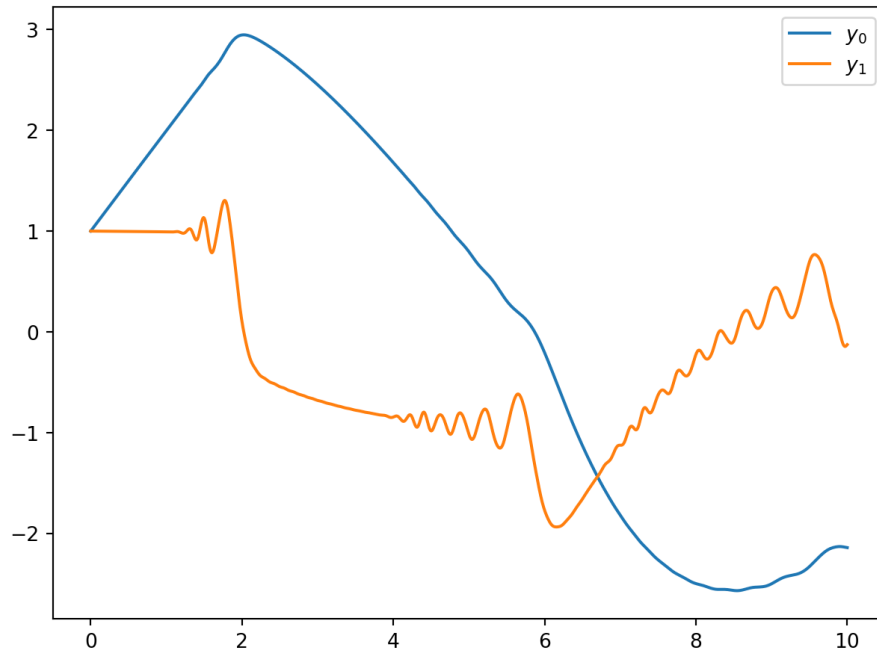


Figure 1: Simulation of the Linear cable mass problem of order 20.

## References

- [1] . A. Burns and B.B. King, "A reduced bases approach to the design of low order feedback controllers for nonlinear continuous systems", ICAM Virginia Polytechnic Institute and State University, Blacksburg