Test core2tex

The PyPHS* development team[1]

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1 System dimensions

$\dim(\mathbf{x}) = n_{\mathbf{x}} = 3;$
$\dim(\mathbf{w}) = n_{\mathbf{w}} = 2;$
$\dim(\mathbf{y}) = n_{\mathbf{y}} = 1;$
$\dim(\mathbf{p}) = n_{\mathbf{p}} = 0;$

2 System variables

State variable $\mathbf{x} = \left(\begin{array}{c} x_{\mathrm{M}} \\ x_{\mathrm{L}} \\ x_{\mathrm{K}} \end{array}\right);$
Dissipation variable $\mathbf{w} = \left(\begin{array}{c} w_{\mathrm{R}} \\ w_{\mathrm{A}} \end{array}\right);$
Input $\mathbf{u} = \left(\begin{array}{c} u_{\mathrm{IN}} \end{array}\right);$
Output $\mathbf{y} = \left(\begin{array}{c} y_{\mathrm{IN}} \end{array}\right);$

*https://github.com/afalaize/pyphs
†http://s3.ircam.fr

3 Constitutive relations

Hamiltonian $\mathtt{H}(\mathbf{x}) = \frac{K_{K0} x_{\mathrm{K}}}{2} \left(\frac{x_{\mathrm{K}}^3}{2} + x_{\mathrm{K}} \right) + \frac{0.5 x_{\mathrm{M}}^2}{M} + \frac{0.5 x_{\mathrm{L}}^2}{L}$;

Hamiltonian gradient $\nabla\mathtt{H}(\mathbf{x}) = \left(\begin{array}{c} \frac{1.0 x_{\mathrm{M}}}{M} \\ \frac{1.0 x_{\mathrm{L}}}{L} \\ \frac{K_{K0} x_{\mathrm{K}}}{2} \left(\frac{3 x_{\mathrm{K}}^2}{2} + 1 \right) + \frac{K_{K0}}{2} \left(\frac{x_{\mathrm{K}}^3}{2} + x_{\mathrm{K}} \right) \end{array} \right)$;

Dissipation function $\mathbf{z}(\mathbf{w}) = \left(\begin{array}{c} R w_{\mathrm{R}} \\ A w_{\mathrm{A}} \end{array} \right)$;

Jacobian of dissipation function $\mathcal{J}_{\mathbf{z}}(\mathbf{w}) = \left(\begin{array}{cc} R & 0 \\ 0 & A \end{array} \right)$;

4 System parameters

4.1 Constant

parameter	value (SI)
A :	1
R :	1000.0
M :	0.1
L :	0.05
uIN :	None

5 System structure

$$\mathbf{M} = \left(\begin{array}{cccccc} 0 & -1.0 G_{\alpha} & -1.0 & 0 & -1.0 & 0 \\ 1.0 G_{\alpha} & 0 & 0 & -1.0 & 0 & 1.0 \\ 1.0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1.0 & 0 & 0 & 0 & 0 \\ 1.0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1.0 & 0 & 0 & 0 & 0 \end{array} \right);$$

$$\mathbf{M_{xx}} = \left(\begin{array}{ccc} 0 & -1.0 G_{\alpha} & -1.0 \\ 1.0 G_{\alpha} & 0 & 0 \\ 1.0 & 0 & 0 \end{array} \right);$$

$$\mathbf{M_{xw}} = \left(\begin{array}{cc} 0 & -1.0 \\ -1.0 & 0 \\ 0 & 0 \end{array} \right);$$

$$\mathbf{M_{xy}} = \begin{pmatrix} 0 \\ 1.0 \\ 0 \end{pmatrix};$$
$$\mathbf{M_{wx}} = \begin{pmatrix} 0 & 1.0 & 0 \\ 1.0 & 0 & 0 \end{pmatrix};$$
$$\mathbf{M_{ww}} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix};$$
$$\mathbf{M_{wy}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix};$$
$$\mathbf{M_{yx}} = \begin{pmatrix} 0 & -1.0 & 0 \end{pmatrix};$$
$$\mathbf{M_{yw}} = \begin{pmatrix} 0 & 0 \end{pmatrix};$$
$$\mathbf{M_{yy}} = \begin{pmatrix} 0 \end{pmatrix};$$

$$\mathbf{J} = \begin{pmatrix} 0 & -1.0G_\alpha & -1.0 & 0 & -1.0 & 0 \\ 1.0G_\alpha & 0 & 0 & -1.0 & 0 & 1.0 \\ 1.0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1.0 & 0 & 0 & 0 & 0 \\ 1.0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1.0 & 0 & 0 & 0 & 0 \end{pmatrix};$$
$$\mathbf{J_{xx}} = \begin{pmatrix} 0 & -1.0G_\alpha & -1.0 \\ 1.0G_\alpha & 0 & 0 \\ 1.0 & 0 & 0 \end{pmatrix};$$
$$\mathbf{J_{xw}} = \begin{pmatrix} 0 & -1.0 \\ -1.0 & 0 \\ 0 & 0 \end{pmatrix};$$
$$\mathbf{J_{xy}} = \begin{pmatrix} 0 \\ 1.0 \\ 0 \end{pmatrix};$$
$$\mathbf{J_{ww}} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix};$$
$$\mathbf{J_{wy}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix};$$
$$\mathbf{J_{yy}} = \begin{pmatrix} 0 \end{pmatrix};$$

$$\mathbf{R} = \begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix};$$

$$\mathbf{R_{xx}} = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix};$$

$$\mathbf{R_{xw}} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \end{pmatrix};$$

$$\mathbf{R_{xy}} = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix};$$

$$\mathbf{R_{ww}} = \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix};$$

$$\mathbf{R_{wy}} = \begin{pmatrix} 0 \\ 0 \end{pmatrix};$$

$$\mathbf{R_{yy}} = \begin{pmatrix} 0 \end{pmatrix};$$