Structure of pHs RLC

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1 System netlist

line	label	dictionary.component	nodes	parameters
ℓ_1	IN	electronics.source	('A', 'ref')	'type': 'voltage'
ℓ_2	R1	electronics.resistor	('A', 'B')	'R': ('R1', 1000.0)
ℓ_3	R2	electronics.resistor	('B', 'C')	'R': ('R2', 1000.0)
ℓ_4	L	electronics.inductor	('B', 'C')	'L': ('L', 0.05)
ℓ_5	C	electronics.capacitor	('C', 'ref')	'C': ('C', 2e-06)

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

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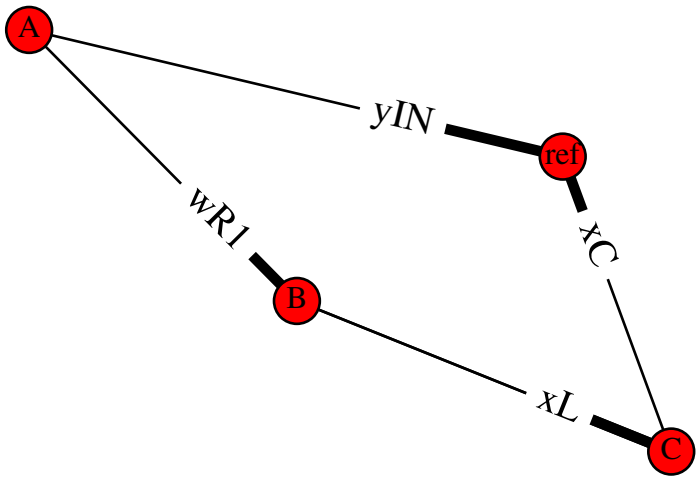

Figure 1: Graph of system `RLC`.

2 System variables

State variable $\mathbf{x} = \begin{pmatrix} x_{\mathrm{L}} \\ x_{\mathrm{C}} \end{pmatrix}$;
Dissipation variable $\mathbf{w} = \begin{pmatrix} w_{\mathrm{R1}} \\ w_{\mathrm{R2}} \end{pmatrix}$;
Input $\mathbf{u} = \begin{pmatrix} u_{\mathrm{IN}} \end{pmatrix}$;
Output $\mathbf{y} = \begin{pmatrix} y_{\mathrm{IN}} \end{pmatrix}$;

3 Constitutive relations

Hamiltonian $\mathtt{H}(\mathbf{x}) = \frac{0.5}{\mathrm{L}} \cdot x_{\mathrm{L}}^2 + \frac{0.5}{\mathrm{C}} \cdot x_{\mathrm{C}}^2$;
Hamiltonian gradient $\nabla \mathtt{H}(\mathbf{x}) = \begin{pmatrix} \frac{1.0}{\mathrm{L}} \cdot x_{\mathrm{L}} \\ \frac{1.0}{\mathrm{C}} \cdot x_{\mathrm{C}} \end{pmatrix}$;

Dissipation function $\mathbf{z}(\mathbf{w}) = \begin{pmatrix} \frac{w_{\mathrm{R1}}}{\mathrm{R1}} \\ \mathrm{R2} \cdot w_{\mathrm{R2}} \end{pmatrix}$;

Jacobian of dissipation function $\mathcal{J}_{\mathbf{z}}(\mathbf{w}) = \begin{pmatrix} \frac{1}{\mathrm{R1}} & 0 \\ 0 & \mathrm{R2} \end{pmatrix}$;

4 System parameters

4.1 Constant

parameter	value (SI)
C	2e-06
R1	1000.0
R2	1000.0
L	0.05

$$\mathbf{J} = \begin{pmatrix} 0 & 0 & 0 & 1.0 & 0 \\ 0 & 0 & 1.0 & 0 & 0 \\ 0 & -1.0 & 0 & -1.0 & 1.0 \\ -1.0 & 0 & 1.0 & 0 & 0 \\ 0 & 0 & -1.0 & 0 & 0 \end{pmatrix};$$