

Capacitor & Inductor Laws

Electrical Engineering

The two reactive elements as exact duals, from defining law to DC behaviour.

Everything on the right is the mirror image of the left.

Property	Capacitor	Inductor
Defining law	$i = C \, dv/dt$	$v = L \, di/dt$
Cannot change instantly	Voltage	Current
Stored energy	$\frac{1}{2}CV^2$	$\frac{1}{2}LI^2$
Impedance	$1/(j\omega C)$	$j\omega L$
DC steady state	Open circuit	Short circuit
In series	$1/C = 1/C_1 + 1/C_2$	$L = L_1 + L_2$

The duality is exact: swap v for i and C for L and any capacitor result becomes the matching inductor result.