Table Comparing Properties of Resistors, Inductors and Capacitors

Component	Resistors	Inductors	Capacitors
Symbol	R	L	C
Unit	Ohms	Henrys	Farads
Math Model	a) $v = i R$ b) $i = v/R$	a) $v = L \, di/dt$ b) $i(t) = i(t_0) + \frac{1}{L}\int_{t_0}^{t} v d\tau$	a) $i = C \, dv/dt$ b) $v(t) = v(t_0) + \frac{1}{C}\int_{t_0}^{t} i d\tau$
Power	a) $p = iv$ b) $p = i^2 r$ c) $p = v^2/r$	a) $p = iv$ b) $p = i L \, di/dt$ c) $p = v\left[i(t_0) + \frac{1}{L}\int_{t_0}^{t} v d\tau \right]$	a) $p = iv$ b) $p = v C \, dv/dt$ c) $p = i\left[v(t_0) + \frac{1}{C}\int_{t_0}^{t} i d\tau \right]$
Energy	a) $dw = p \, dt$ b) $w = \int p \, dt$	a) $dw = p \, dt$ b) $w = Li^2/2$	a) $dw = p \, dt$ b) $w = Cv^2/2$
Series	$R_s = R_1 + R_2 + R_3$	$L_s = L_1 + L_2 + L_3$	$\frac{1}{C_s} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$
Parallel	$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$	$\frac{1}{L_p} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3}$	$C_p = C_1 + C_2 + C_3$
Time Constant	Not applicable	L/R	RC
DC Steady State	$V = IR$	$V=0$ (short cct)	$I=0$ (open cct)
Natural Response		$i_L(t) = I_0 e^{-t/\tau}$	$v_C(t) = V_0 e^{-t/\tau}$
Step Response		$i_L(t) = I_f + (I_o - I_f) e^{-t/\tau}$	$v_C(t) = V_f + (V_o - V_f) e^{-t/\tau}$