

Electrical Circuit (1)

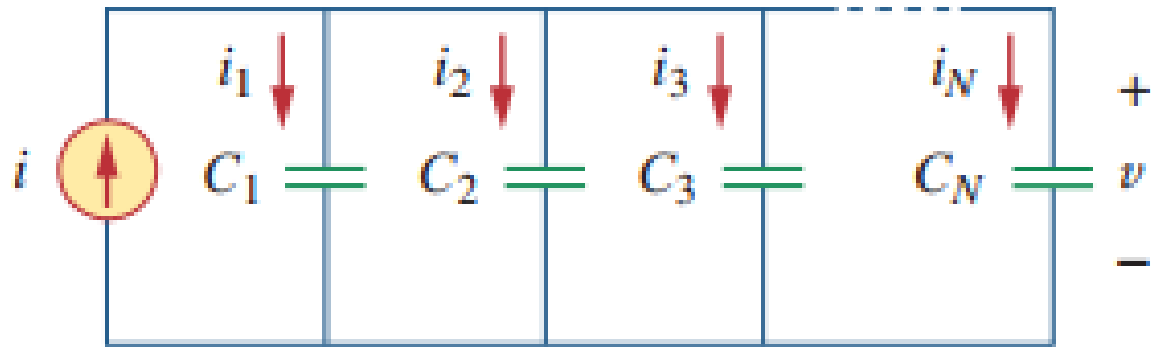
Inductor and Capacitor (Week11 Class1)

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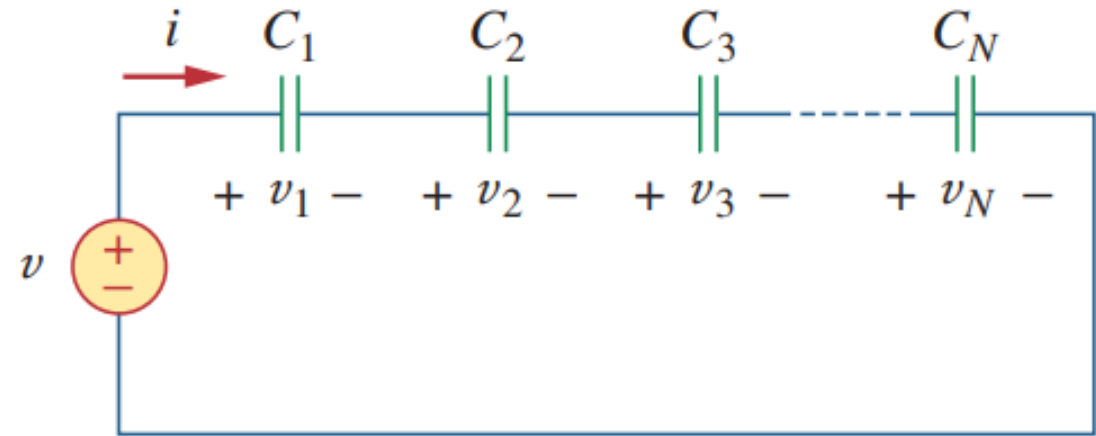
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Series and Parallel Capacitors

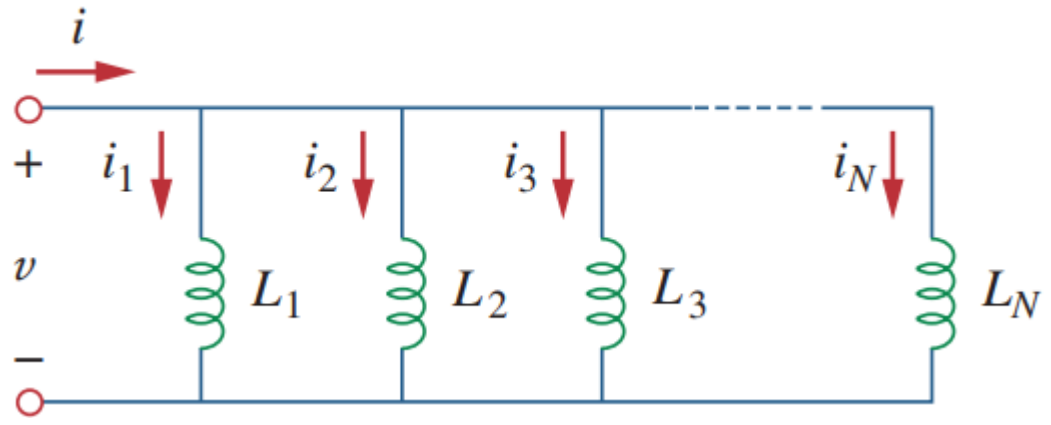


$$C_{\text{eq}} = C_1 + C_2 + C_3 + \dots + C_N$$

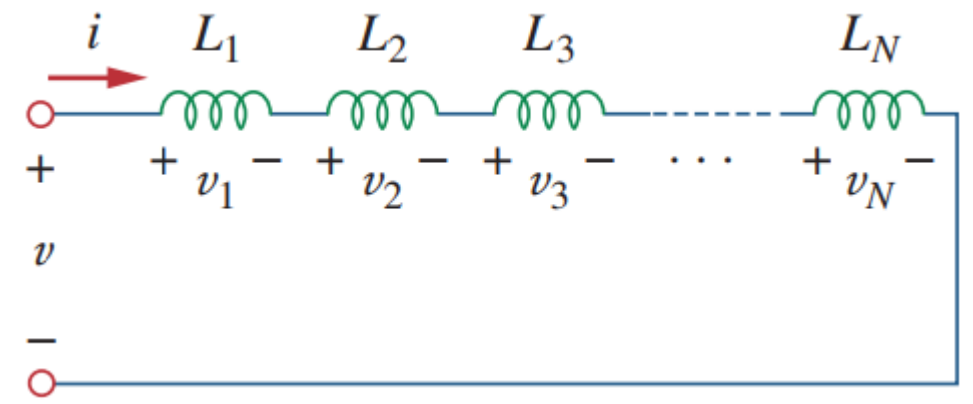


$$\frac{1}{C_{\text{eq}}} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \dots + \frac{1}{C_N}$$

Series and Parallel Inductors



$$\frac{1}{L_{eq}} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3} + \dots + \frac{1}{L_N}$$



$$L_{eq} = L_1 + L_2 + L_3 + \dots + L_N$$

TABLE 6.1Important characteristics of the basic elements.[†]

Relation	Resistor (R)	Capacitor (C)	Inductor (L)
v - i :	$v = iR$	$v = \frac{1}{C} \int_{t_0}^t i(\tau) d\tau + v(t_0)$	$v = L \frac{di}{dt}$
i - v :	$i = v/R$	$i = C \frac{dv}{dt}$	$i = \frac{1}{L} \int_{t_0}^t v(\tau) d\tau + i(t_0)$
p or w :	$p = i^2 R = \frac{v^2}{R}$	$w = \frac{1}{2} C v^2$	$w = \frac{1}{2} L i^2$
Series:	$R_{\text{eq}} = R_1 + R_2$	$C_{\text{eq}} = \frac{C_1 C_2}{C_1 + C_2}$	$L_{\text{eq}} = L_1 + L_2$
Parallel:	$R_{\text{eq}} = \frac{R_1 R_2}{R_1 + R_2}$	$C_{\text{eq}} = C_1 + C_2$	$L_{\text{eq}} = \frac{L_1 L_2}{L_1 + L_2}$
At dc:	Same	Open circuit	Short circuit
Circuit variable that cannot change abruptly:	Not applicable	v	i

[†] *Passive sign convention is assumed.*

