General terms

Electrical power P

$$P = \frac{V^2}{R} = I^2 R \ [W]$$

Current density J

$$J = \frac{I}{A} \Big| A \Big| m^2$$

Resistance R

$$R = \frac{V}{I} \ [\Omega] \quad \text{(Ohm's law)}$$

Conductance G

$$G = 1/R \ [25]$$

Quantity of electricity, charge Q

$$q = \int i \cdot dt \ [\mathrm{C}]$$

Capacitance C

$$C = \frac{Q}{V}$$

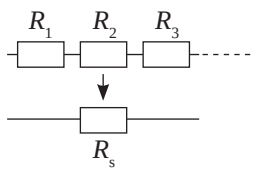
Inductance L

$$L = N \frac{\phi}{I} = N \frac{\phi_t}{i}$$

Series Connection

Total resistance R_s (according to s 26)

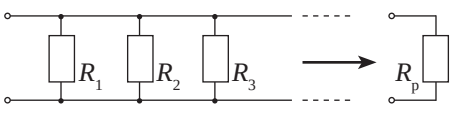
$$R_S = R_1 + R_2 + R_3 + \cdots$$



Parallel Connection

Total resistance R_p (according to s 30)

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \cdots$$



Inductance

Inductance in series

$$L = L_1 + L_2 + L_3 + \cdots$$

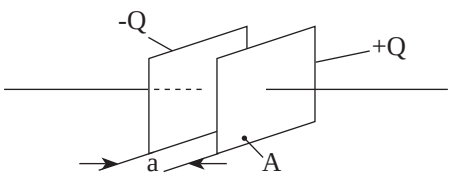
Inductance in parallel

$$\frac{1}{L} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3} + \cdots$$

Electric field

Capacitance C ***of a capacitor***

$$C = \frac{\varepsilon_o \cdot \varepsilon_r \cdot A}{a} \ [F]$$



Capacitors connected in parallel

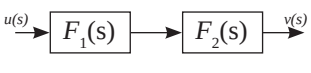
$$C = C_1 + C_2 + C_3 + \cdots$$

Capacitors connected in series

$$\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \cdots$$

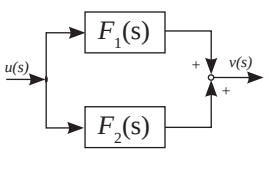
Transfer function

Series combination



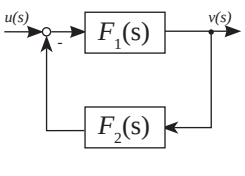
$$F(s) = F_1(s) \cdot F_2(s)$$

Parallel combination



$$F(s) = F_1(s) + F_2(s)$$

Feedback rule



$$F(s) = \frac{F_1(s)}{1 + F_1(s) \cdot F_2(s)}$$