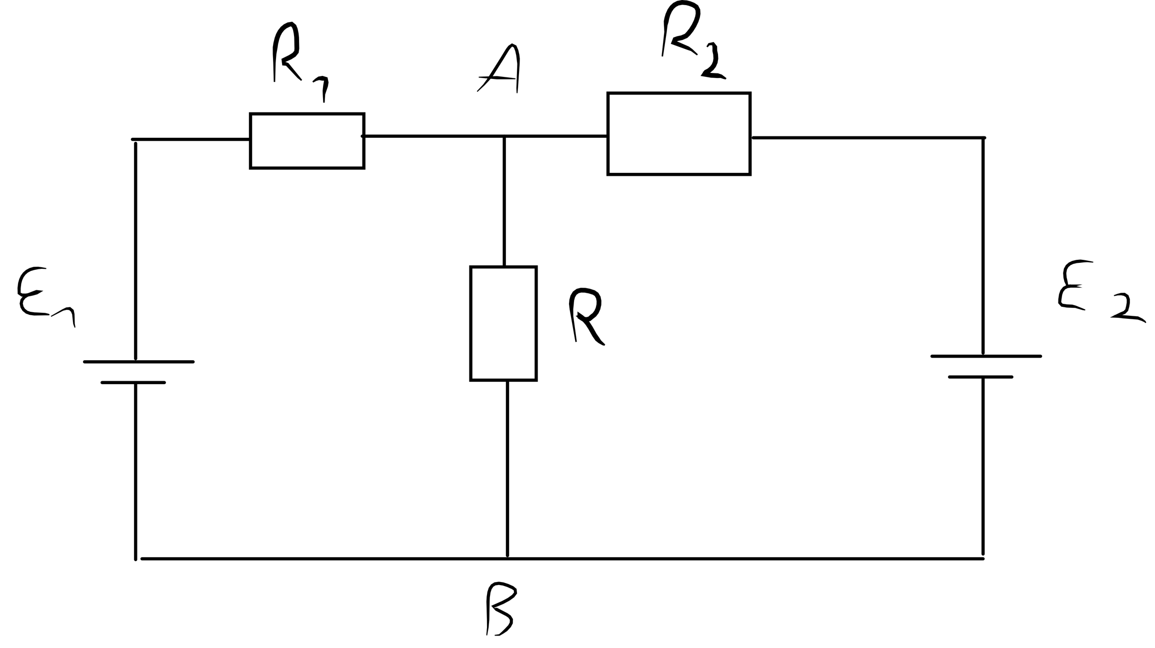
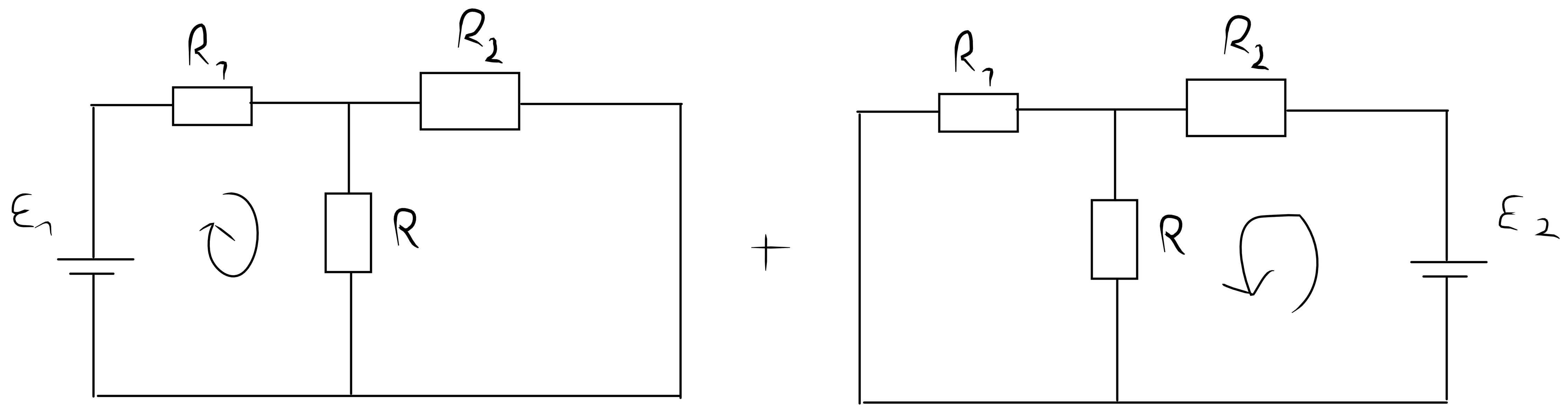




$$\varepsilon_1 = R_1 I + R I_R'$$

$$R_w = R_1 + \frac{R R_2}{R+R_2}$$

$$I = \frac{\varepsilon_1}{R_w}$$

$$\frac{R}{R_2} = \frac{I_2}{I_R'} = \frac{I - I_R'}{I_R'}$$

$$R I_R' = R_2 I - R_2 I_R'$$

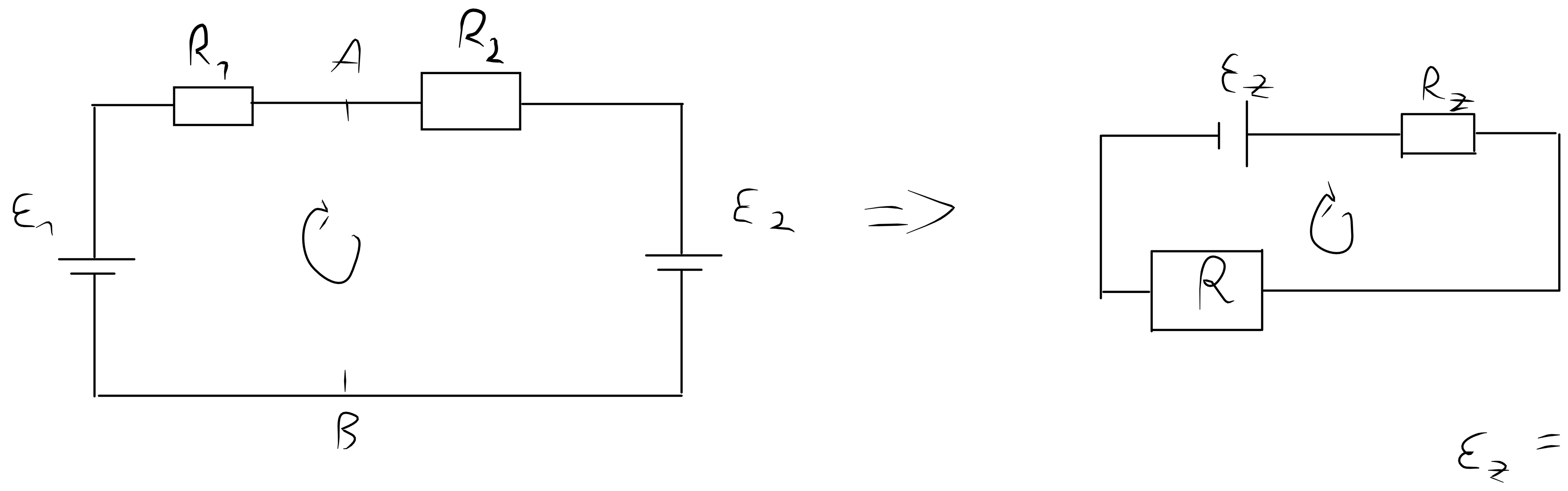
$$I_R' = \frac{\varepsilon_1}{R_1 + \frac{R R_2}{R+R_2}} \cdot \frac{R_2}{R+R_2} =$$

$$= \frac{\varepsilon_1 R_2}{R R_2 + R R_1 + R_1 R_2}$$

$$\varepsilon_2 = R_2 I + R I_R''$$

$$I_R'' = \frac{\varepsilon_2 R_1}{R R_2 + R R_1 + R_1 R_2}$$

$$I = \frac{\varepsilon_1 R_2 + \varepsilon_2 R_1}{R R_2 + R R_1 + R_1 R_2}$$



$$\varepsilon_z = I_R (R + R_z)$$

$$I = \frac{\varepsilon_1 - \varepsilon_2}{R_1 + R_2} \qquad u_{AB} = \varepsilon_1 - R_1 I = \varepsilon_2 + R_2 I$$

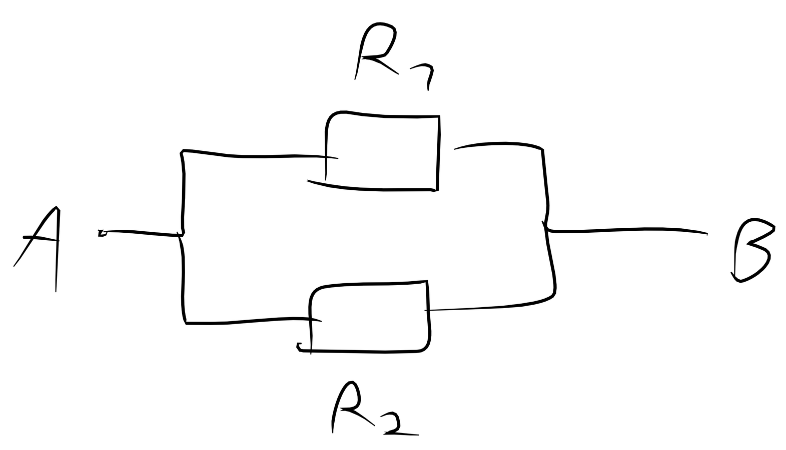
$$\varepsilon_z = \varepsilon_1 - \frac{R_1}{R_1+R_2}(\varepsilon_1 - \varepsilon_2) = \varepsilon_2 + \frac{R_2}{R_1+R_2}(\varepsilon_1 - \varepsilon_2)$$

$$I_R = \frac{\varepsilon_1 R_2 + \varepsilon_2 R_1}{R + \frac{R_1 R_2}{R_1+R_2}} \frac{1}{R_1+R_2} =$$

$$2\varepsilon_z = \frac{1}{R_1+R_2}\left(\cancel{\varepsilon_1 R_1} + \varepsilon_1 R_2 - \cancel{\varepsilon_1 R_1} + \varepsilon_1 R_2 + \varepsilon_2 R_1 + \cancel{\varepsilon_2 R_2} + R_2 \varepsilon_1 - \cancel{R_2 \varepsilon_2}\right)$$

$$= \frac{\varepsilon_1 R_2 + \varepsilon_2 R_1}{R R_1 + R_1 R_2 + R R_2}$$

$$\varepsilon_z = \frac{1}{R_1+R_2}(\varepsilon_1 R_2 + \varepsilon_2 R_1)$$



$$R_z = \frac{R_1 R_2}{R_1 + R_2}$$

$$P = I^2 R = \left(\frac{\varepsilon_1 R_2 + \varepsilon_2 R_1}{R R_1 + R_1 R_2 + R R_2}\right)^2 R$$

$$\frac{dP}{dR} = 2 R I \frac{dI}{dR} + I^2 = 0$$

$$2 R \frac{dI}{dR} + I = 0$$

$$\frac{dI}{dR} = \frac{-(R_1+R_2)(\varepsilon_1 R_2 + \varepsilon_2 R_1)}{(R R_1 + R_1 R_2 + R R_2)^2}$$

$$\cancel{\frac{\varepsilon_1 R_2 + \varepsilon_2 R_1}{R R_1 + R_1 R_2 + R R_2}} = \frac{2R(R_1+R_2)}{(R R_1 + R_1 R_2 + R R_2)^{\cancel{2}}} \cancel{(\varepsilon_1 R_2 + \varepsilon_2 R_1)}$$

$$\cancel{R R_1} + R_1 R_2 + \cancel{R R_2} = \cancel{2} R (R_1 + R_2)$$

$$R = \frac{R_1 R_2}{R_1 + R_2}$$

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