

$$R'_w = \frac{(R_5 + R_3) R_2}{R_5 + R_3 + R_2} + R_1 + R_4$$

$$R''_w = R_2 + \frac{(R_1 + R_4)(R_3 + R_5)}{R_1 + R_3 + R_4 + R_5}$$

$$R'''_w = R_3 + R_5 + \frac{(R_1 + R_4) R_2}{R_1 + R_4 + R_2}$$

$$I'_1 = \frac{E_1}{\frac{(R_5 + R_3) R_2}{R_5 + R_3 + R_2} + R_1 + R_4}$$

$$I''_1 = \frac{E_2}{R''_w} \quad \frac{I''_1}{I''_3} = \frac{R_3 + R_5}{R_1 + R_4} = \frac{I''_1}{I''_1 - I''_1}$$

$$I'''_1 = \frac{E_3}{R'''_w}$$

$$\frac{I'''_1}{I'''_2} = \frac{R_2}{R_1 + R_4} = \frac{I'''_1}{I'''_1 - I'''_1}$$

$$R_2 = R_3 = R_4 + R_5 = R$$

$$I'_1 = \frac{E_1}{\frac{5}{3}R + R_1}$$

$$R''_w = R + \frac{(R_1 + R)2R}{4R} = \frac{3}{2}R + \frac{1}{2}R_1$$

$$\frac{I''_1}{\frac{E_2}{\frac{3}{2}R + \frac{1}{2}R_1} - I''_1} = \frac{2R}{R_1 + R}$$

$$I''_1 R_1 + I''_1 R = -2R I''_1 + \frac{4E_2 R}{3R + R_1}$$

$$I''_1 (R_1 + 3R) = \frac{4E_2 R}{3R + R_1}$$

$$I''_1 = \frac{4E_2 R}{(3R + R_1)^2}$$

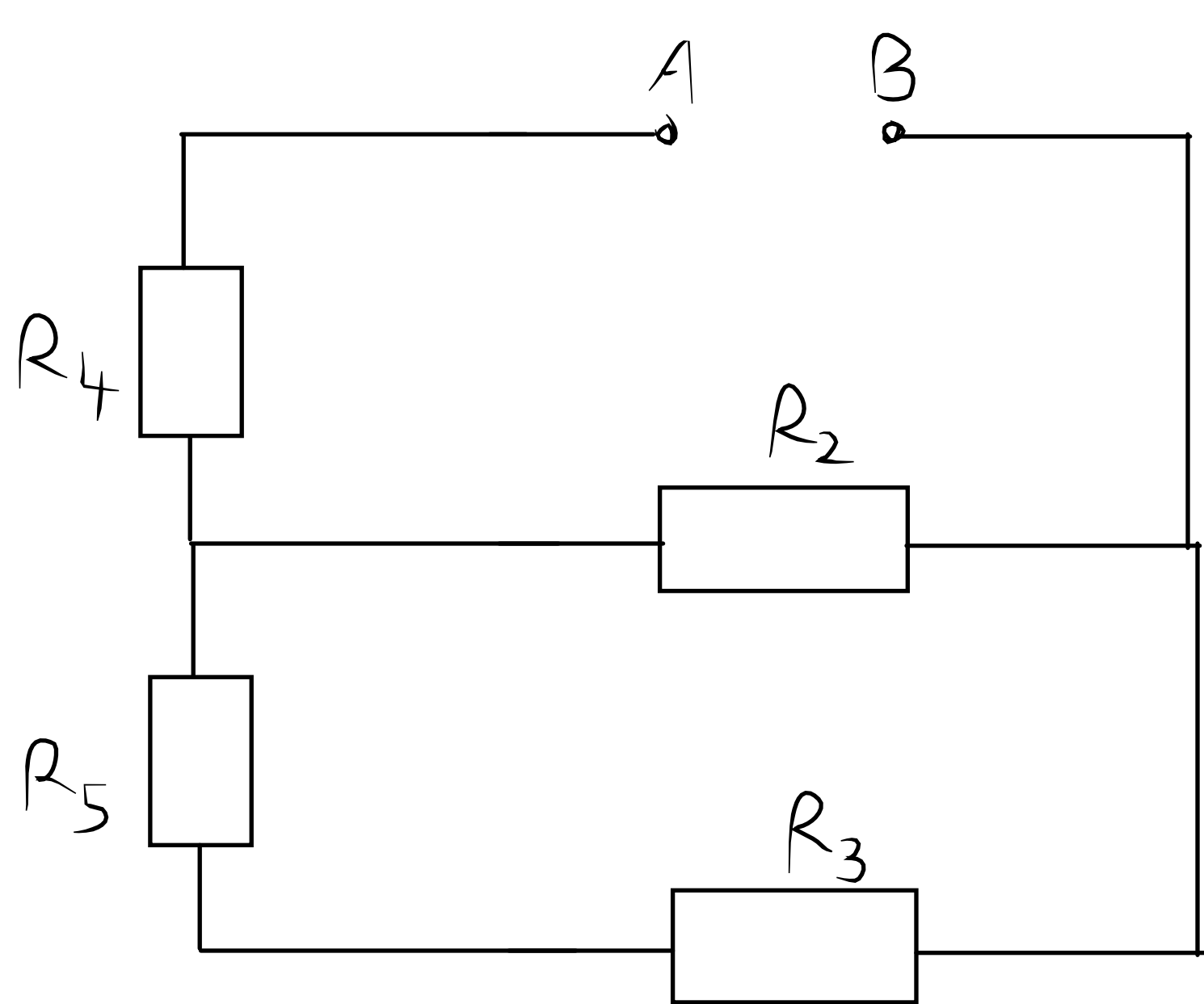
$$R'''_w = \frac{7}{3}R + \frac{1}{3}R_1 \quad I'''_1 = \frac{3E_3}{7R + R_1}$$

$$\frac{R}{R_1 + R} = \frac{I'''_1}{\frac{3E_3}{7R + R_1} - I'''_1}$$

$$I'''_1 R_1 + I'''_1 R = \frac{3E_3 R}{7R + R_1} - I'''_1 R$$

$$I'''_1 = \frac{3E_3 R}{(7R + R_1)(R_1 + 2R)}$$

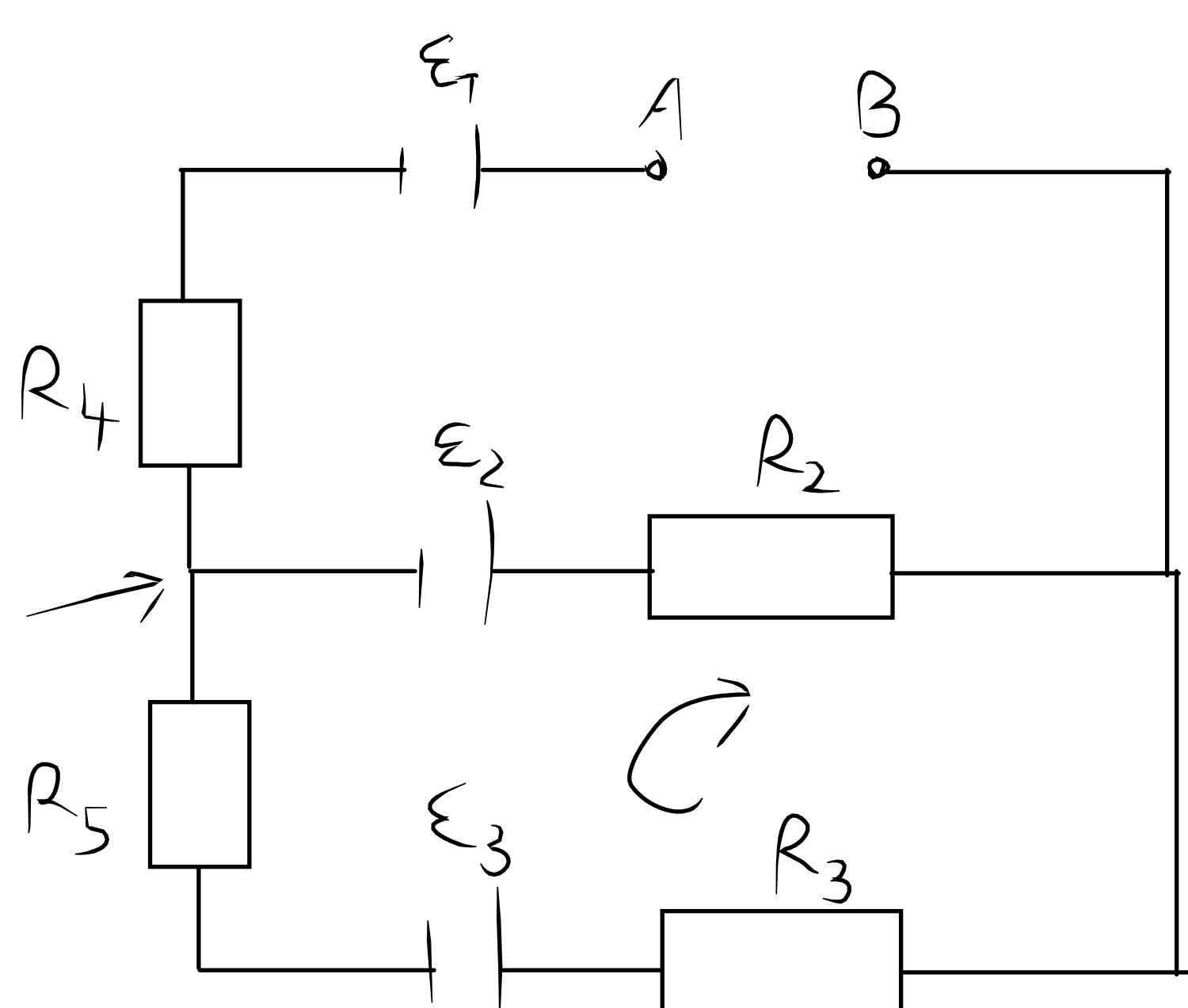
$$I_1 = I'_1 - I''_1 - I'''_1$$



$$R_2 = R_4 + \frac{R_2(R_5 + R_3)}{R_2 + R_5 + R_3}$$

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$$R_2 = R + \frac{2R^2}{3R} = \frac{5}{3}R$$



$$I = \frac{E_2 - E_3}{R_2 + R_3 + R_5}$$

$$E_2 = -E_1 + E_2 - \frac{E_2 - E_3}{R_2 + R_3 + R_5} R_2$$

W zadaniu

$$E_2 = E_2 - E_1 - \frac{1}{3}E_2 + \frac{1}{3}E_3 = \frac{1}{3}E_3 + \frac{2}{3}E_2 - E_1$$

$$I_1 = \frac{\frac{1}{3}E_3 + \frac{2}{3}E_2 - E_1}{\frac{5}{3}R + R_1}$$