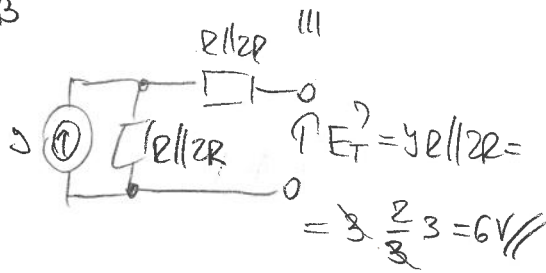
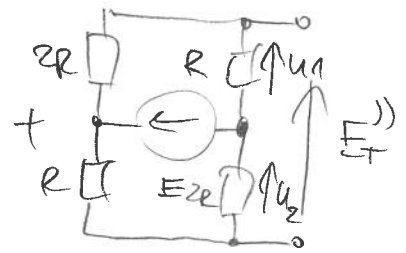
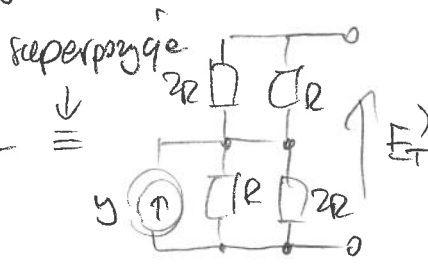
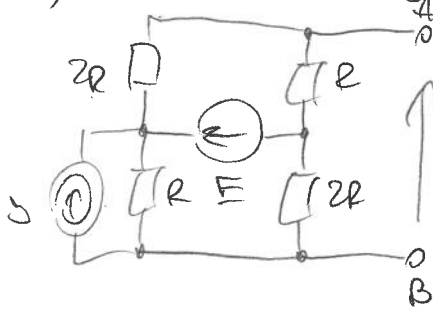


Zadanie 2:

$\{V, A, R\}$

e) z tw. o zr. rozdzielnych

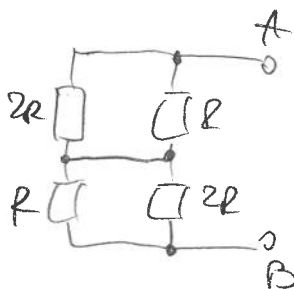


$$U_1 = E \frac{R}{R+2R} = \frac{1}{3} E$$

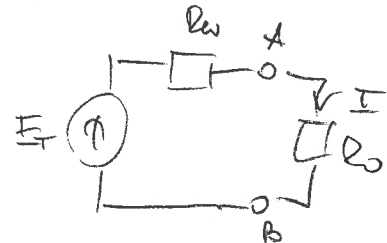
$$U_2 = -E \frac{2R}{R+2R} = -\frac{2}{3} E$$

$$E_T'' = U_2 + U_1 = -\frac{1}{3} E = -1V$$

$$E_T = E_T' + E_T'' = 6 + (-1) = 5V$$

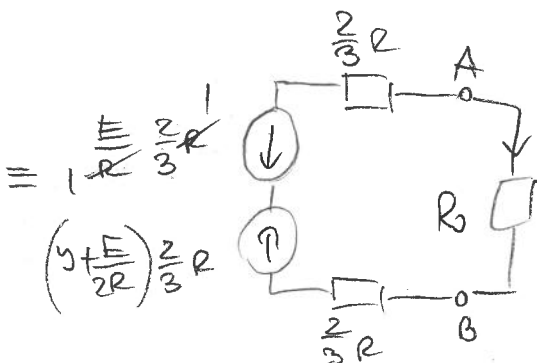
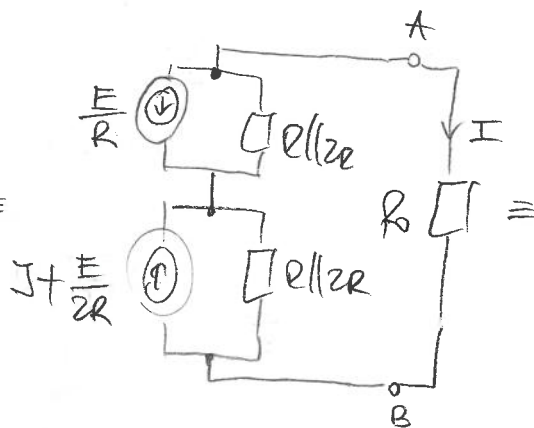
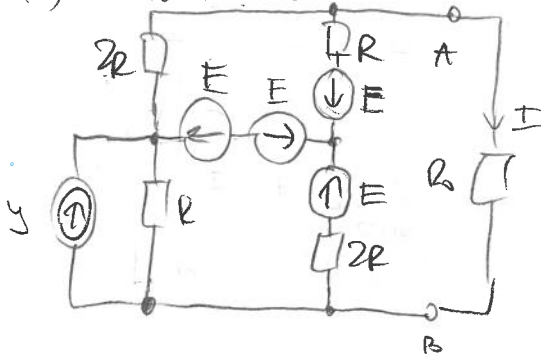


$$R_w = R_{AB} = 2 + \frac{2 \cdot 2}{2+2} = 2 + \frac{2}{1} = 4R$$



$$I = \frac{E_T}{R_w + R_0} = \frac{5}{4+1} = 1A$$

b) z możliwości źródeł



$$I = \frac{\frac{2}{3} J R + \frac{1}{3} E - \frac{2}{3} E}{2 \cdot \frac{2}{3} R + R} = \frac{\frac{2}{3} \cdot 3 \cdot 3 - \frac{1}{3} \cdot 3}{2 \cdot \frac{2}{3} \cdot 3 + 1} = 1A$$

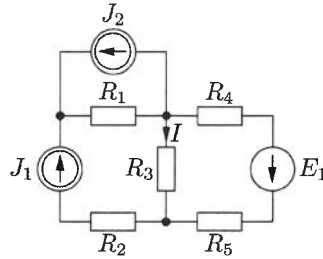
c) z superpozycji też możliwe, ale konieczne jest wyznaczenie punktów zerowania $\Delta \rightarrow$ przy liczeniu utrudni od E

Imię

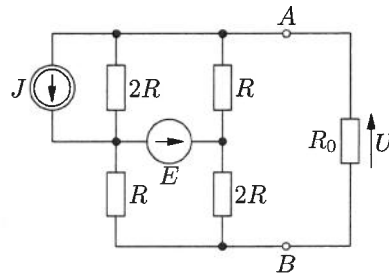
 Nazwisko

 Nr indeksu

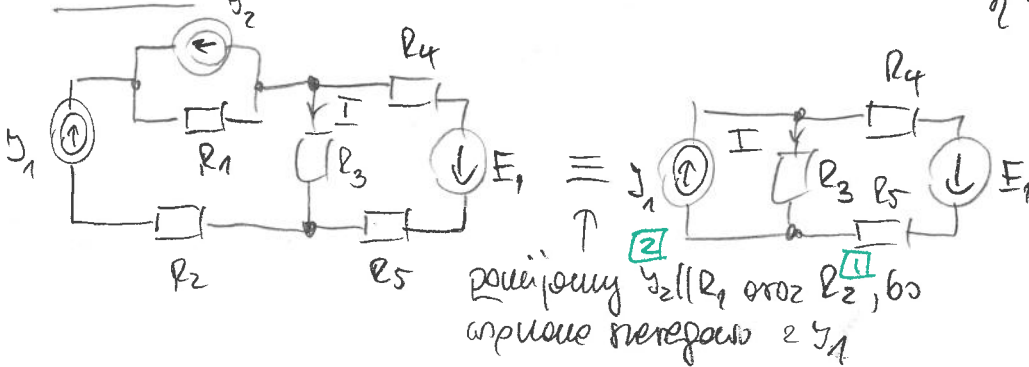
Zadanie 1. (9 pkt) Dany jest obwód prądu stałego. Wyznaczyć prąd I . Dane: $E_1 = 9V$, $J_1 = 1A$, $J_2 = 2A$, $R_1 = 1\Omega$, $R_2 = 2\Omega$, $R_3 = 3\Omega$, $R_4 = 4\Omega$, $R_5 = 5\Omega$.



Zadanie 2. (9 pkt) Dany jest obwód prądu stałego. Wyznaczyć napięcie U . Dane: $E = 9V$, $J = \frac{1}{2}mA$, $R = 6k\Omega$, $R_0 = 8k\Omega$



Zadanie 1:



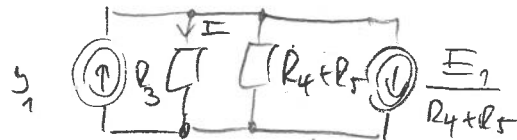
e) z superpozycji

$$I^{(1)} = J_1 \frac{R_4 + R_5}{R_3 + R_4 + R_5} = 1 \frac{8}{12} = \frac{2}{3} A \quad [3]$$

$$I^{(2)} = - \frac{E_1}{R_3 + R_4 + R_5} = - \frac{9}{12} = - \frac{3}{4} A \quad [3]$$

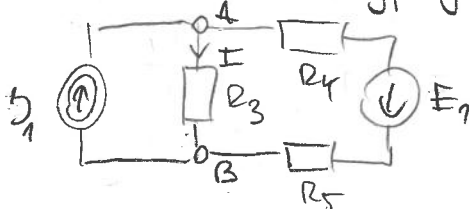
$$I = I^{(1)} + I^{(2)} = 0 A //$$

b) z zmiennym źródłem



$$I = \left(J_1 - \frac{E_1}{R_4 + R_5} \right) \frac{R_4 + R_5}{R_3 + R_4 + R_5} = 0 A //$$

c) z tw. o źr. wzajemnych



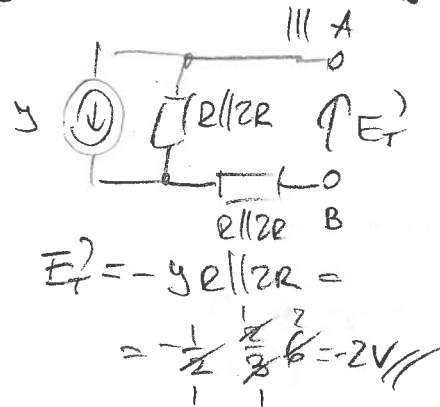
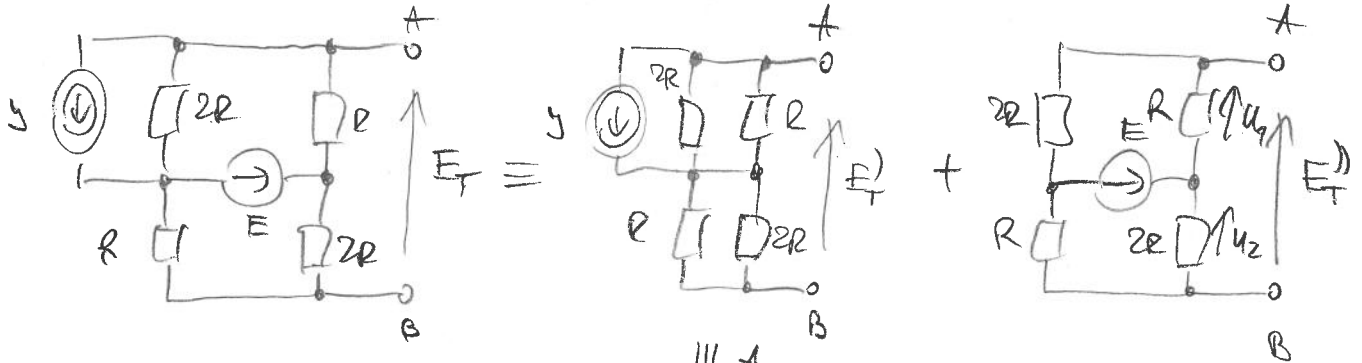
$$I = \left(J_1 - \frac{E_1}{R_4 + R_5} \right) \frac{R_4 + R_5}{R_3 + R_4 + R_5}$$

czyli idzie w pkt. b)

Zadanie 2:

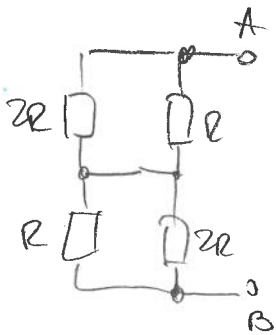
$\{U, I, P, W\}$

e) z tw. o źr. rozłożonych

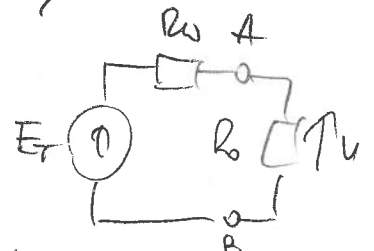


$U_1^{DN} = -E \frac{R}{R+2R} = -\frac{1}{3} E$
 $U_2^{DN} = E \frac{2R}{2R+R} = \frac{2}{3} E$
 $E_T'' = U_1 + U_2 = \frac{1}{3} E = 3V$

$E_T = E_T' + E_T'' = 1V$

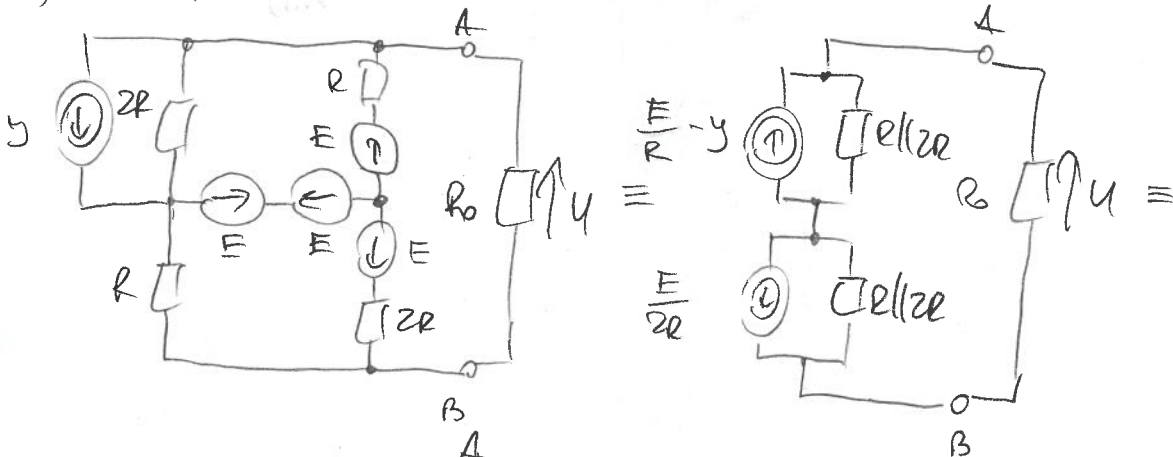


$R_w = R_{AB} = 2 \cdot R || 2R = 2 \cdot \frac{2}{3} R = 2 \cdot \frac{2}{3} \cdot 6 = 8 \Omega$



$U^{DN} = E_T \frac{R_0}{R_0 + R_w} = 1 \cdot \frac{8}{8+8} = \frac{1}{2} V$

b) z możliwości źródeł



$U^{DN} = \left(\frac{E}{R} - y \right) \frac{R_0}{R_0 + \frac{4}{3}R} + \frac{E}{2R} \frac{R_0}{R_0 + \frac{4}{3}R}$
 $= \left(\frac{E}{2} - y \right) \frac{2}{3} R \frac{8}{8 + \frac{4}{3} \cdot 6} + \frac{E}{2 \cdot 6} \frac{8}{8 + \frac{4}{3} \cdot 6} = \left(\frac{E}{2} - y \right) \frac{2}{3} \cdot \frac{8}{8+8} + \frac{E}{12} \cdot \frac{8}{8+8} = \frac{1}{2} V$

c) z superpozycji toż samo, ale bardziej jest rozłożeniem wielkości \rightarrow przy ujęciu ułomu od E