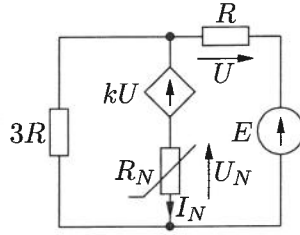
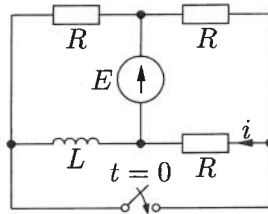


**WEL 21Z gr. 1E1 Kolokwium 2**

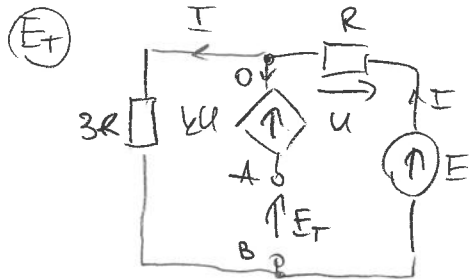
**Zadanie 1. (9 pkt)** Dany jest nieliniowy obwód prądu stałego. Wyznaczyć punkt pracy oporu nieliniowego  $R_N$ . Wykorzystać twierdzenie Thévenin'a. Dane:  $E = 8\text{ V}$ ,  $k = 2\text{ V/V}$ ,  $R = 4\text{ k}\Omega$ ,  $R_N : I_N = aU_N|U_N|$ ,  $a = \frac{1\text{ mA}}{9\text{ V}^2}$ .



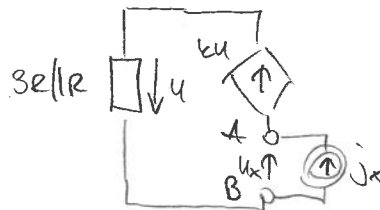
**Zadanie 2. (10 pkt)** W obwodzie przedstawionym na rysunku przed chwilą  $t = 0$  panował stan ustalony. W chwili  $t = 0$  klucz został zamknięty. Wyznaczyć i narysować przebieg prądu  $i$ . Dane:  $E = 6\text{ V}$ ,  $R = 1\text{ k}\Omega$ ,  $L = \frac{1}{3}\text{ mH}$ .



Zadanie 1:  $\{V, \mu A, k\Omega\}$



(Pw)



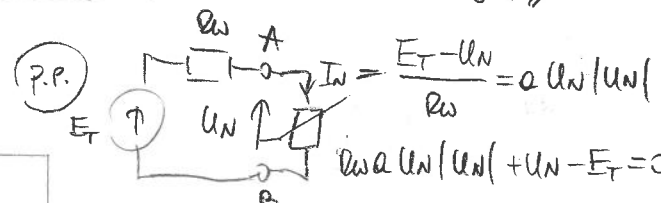
$$U = -3R \parallel R \cdot jx$$

$$U_x = -(k+1)U$$

$$P_w = P_{AB} = \frac{U_x \cdot jx}{jx} = (k+1)3R U jx = 8kR \parallel$$

$$I = \frac{E}{4R} = \frac{8}{4 \cdot 4} = \frac{1}{2} \mu A$$

$$E_T = E - (k+1)U = E - (k+1)RI = 8 - 3 \cdot 4 \cdot \frac{1}{2} = 2V$$

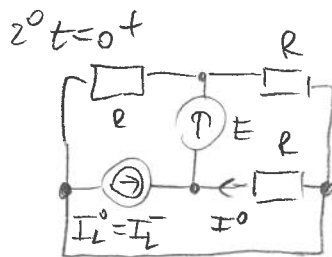
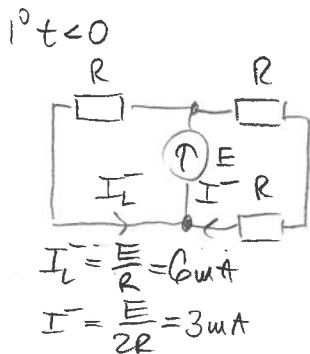


$$I_N = \frac{E_T - U_N}{R_w} = a \frac{U_N |U_N|}{R_w}$$

$$R_w a \frac{U_N |U_N|}{R_w} + U_N - E_T = 0$$

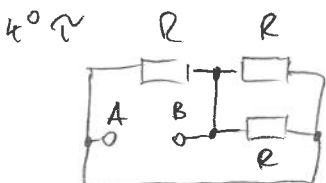
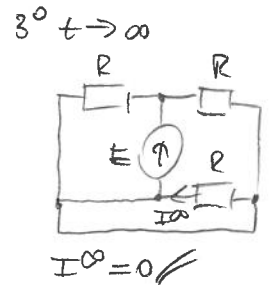
$$U_N |U_N| + U_N - 2 = 0 \Rightarrow U_N = 1V, I_N = \frac{1}{3} \mu A$$

Zadanie 2:  $\{V, \mu A, \mu s, \mu s\}$



z superpozycji:

$$I^0 = \frac{E}{R + \frac{R}{2}} - \frac{1}{3} I_L^0 = 6 \frac{2}{3} - \frac{1}{3} 6 = 2 \mu A$$



$$R_L = R_{AB} = \frac{1}{3} R = \frac{1}{3} k\Omega$$

$$\tau = \frac{L}{R_L} = \frac{1/3}{1/3} = 1 \mu s$$

