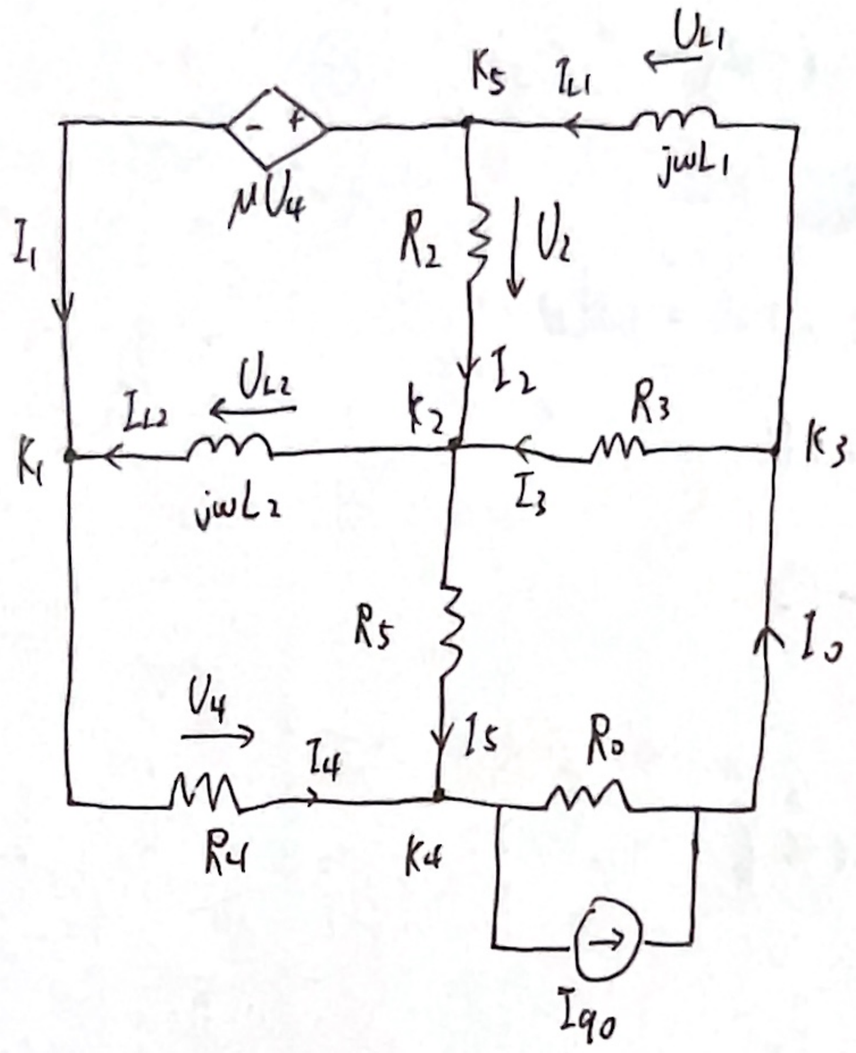
Aufgabe 12

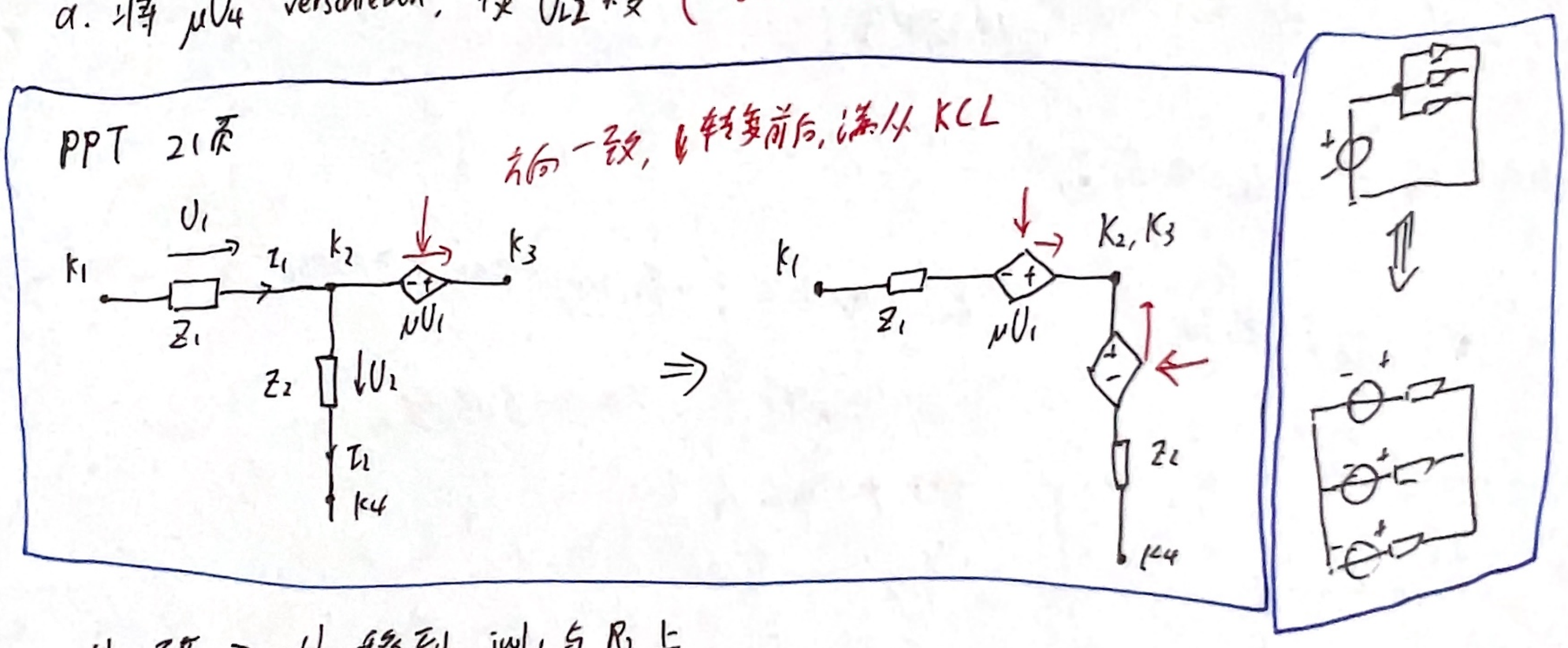


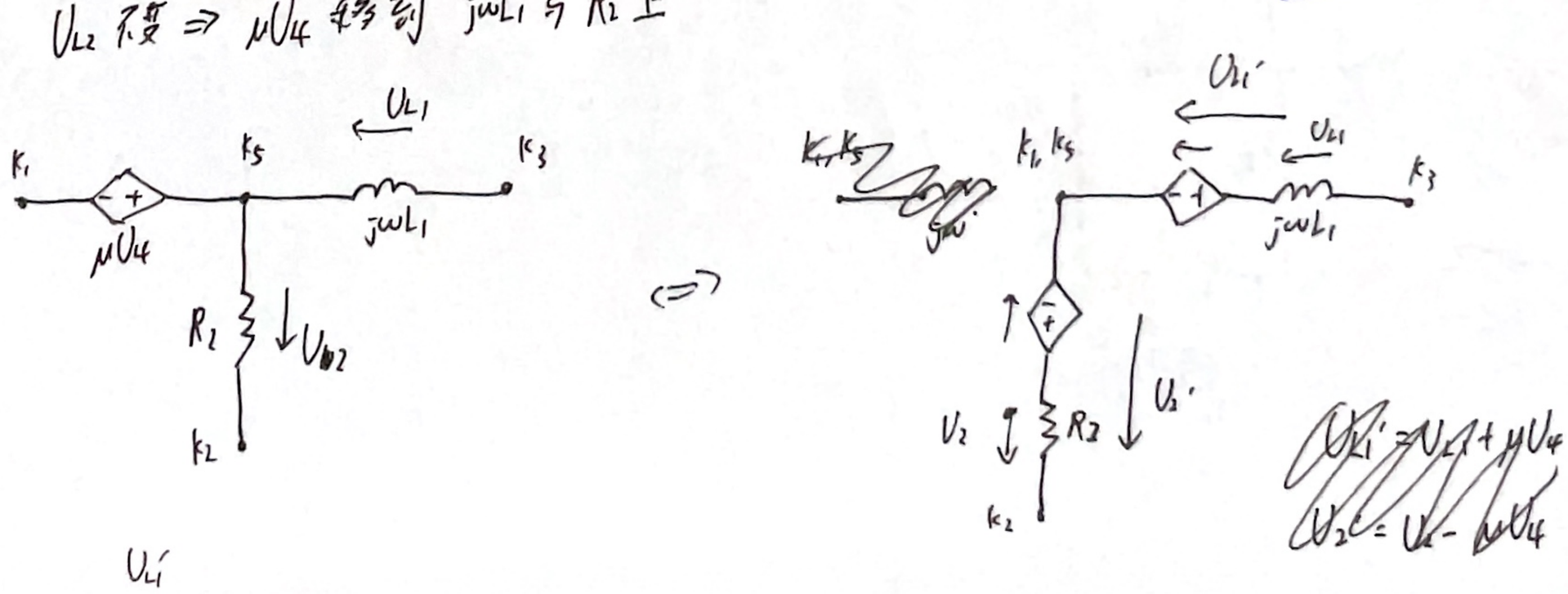
电压源移动，通过 Knoten Zweigspanny 改变

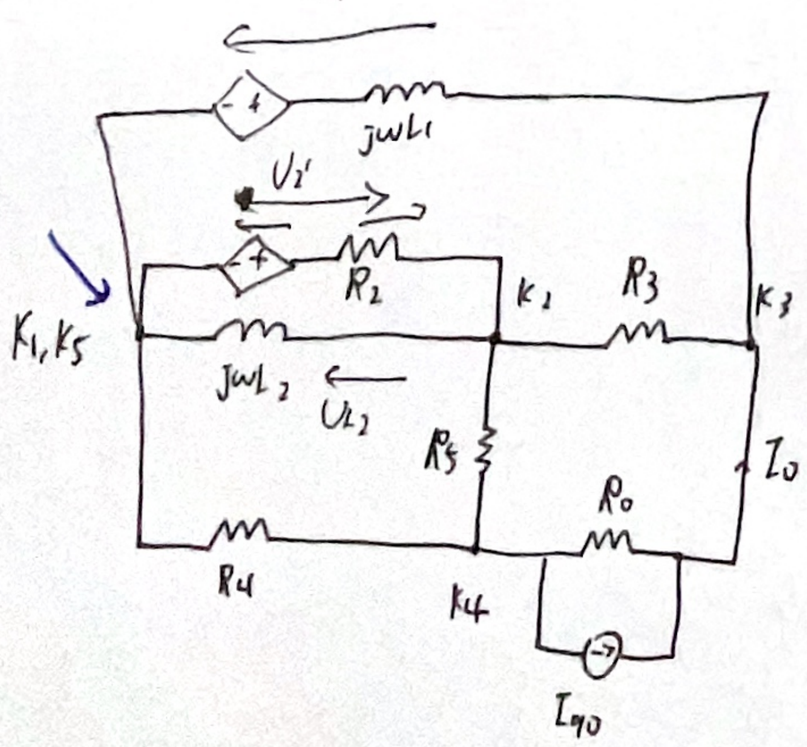
电流源移动，通过 Masche Zweigstrom 改变

a. 将 μU4 verschieben，使 U_{L2} 没 (über K_5)

电压源移动思想







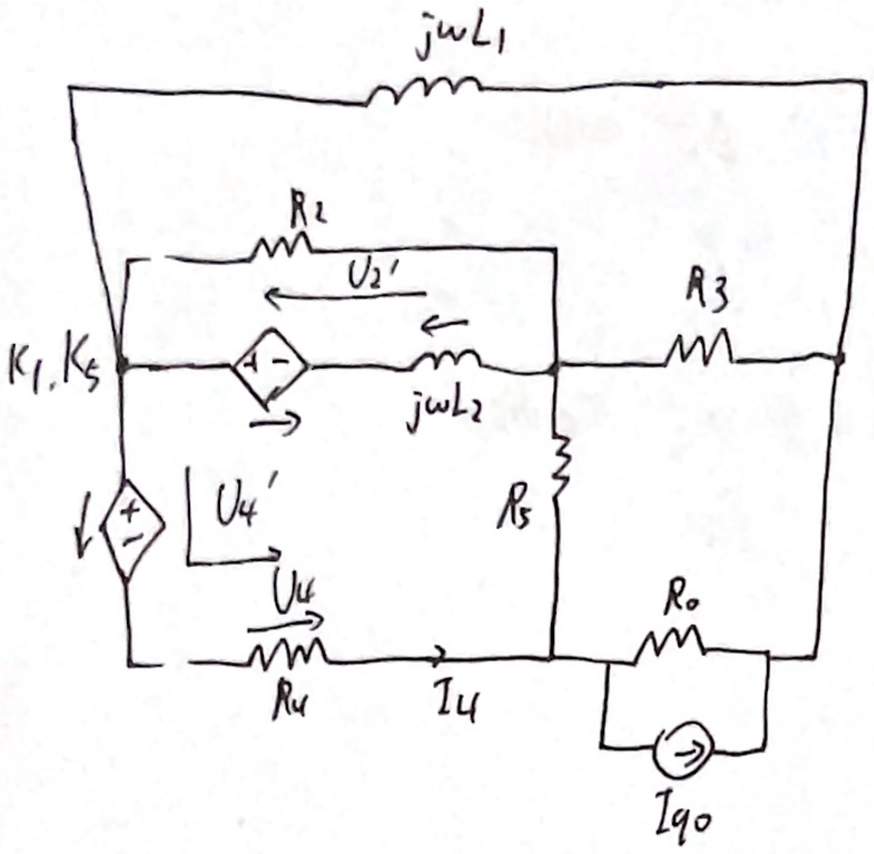
KCL: $I_1 = I_{L1} - I_2$ (Zurückgewinnung von I_1)

$U_{L1}' = U_{L1} + \mu U_4$ ⇔ $U_{L1} = U_{L1}' - \mu U_4$

$U_2' = U_2 - \mu U_4$ ⇔ $U_2 = U_2' + \mu U_4$

} Zweigspanny 改变

b. 将 μU_4 移动, U_4 不变 (über K1)



KCL: $I_1 = I_{L2} - I_4$

$$\begin{cases} U_2' = U_2 - \mu U_4 \\ U_4' = U_4 + \mu U_4 = U_4(1+\mu) \end{cases}$$

$$\Rightarrow \begin{cases} U_2 = U_2' + \mu U_4 \\ U_4 = \frac{1}{1+\mu} U_4' \end{cases}$$

Quellenverschieby nur für $\mu \neq -1$ möglich

一定要写

由于受控源在自己的支路中 ⇒ 要下移

μU_4 → $\mu \frac{1}{1+\mu} U_4' = \frac{\mu}{1+\mu} U_4'$ 受控源进化了

重新列写: $U_4' = \frac{\mu}{1+\mu} U_4' + R_4 \cdot I_4$

$U_4'\left(\frac{1}{1+\mu}\right) = R_4 I_4$ ⇔ $U_4' = R_4 I_4 (1+\mu) = I_4 \cdot \underline{R_4(1+\mu)}$ 得到一个新电阻

根据 UI 关系, 得到一个新的支路

使其重新估入