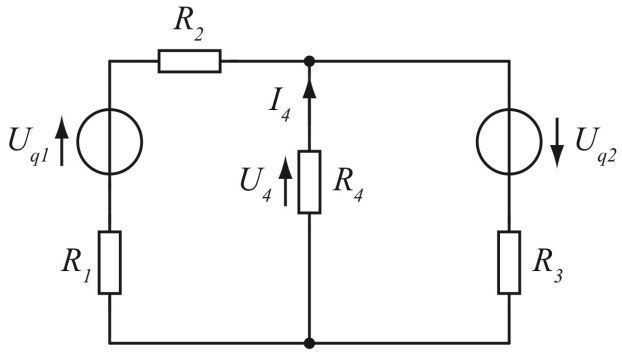
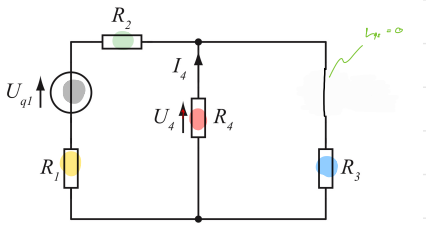
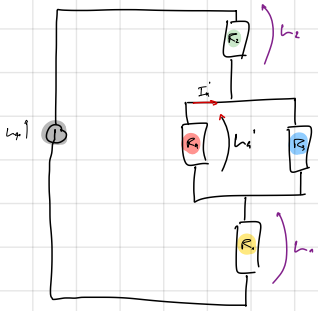
Berechnen Sie im untenstehenden Netzwerk unter Anwendung des Superpositionsprinzips die Spannung U_4 und den Strom I_4. Gegeben sind $U_{q1} = 12\,\mathrm{V}$, $U_{q2} = 18\,\mathrm{V}$, $R_1 = R_2 = 2\,\Omega$ und $R_3 = R_4 = 4\,\Omega$.



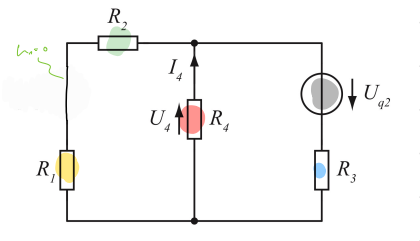
Übung 3.1

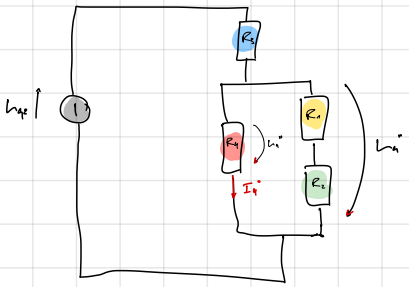
Einfluss Quelle 1 :





Einfluss Quelle 2 :





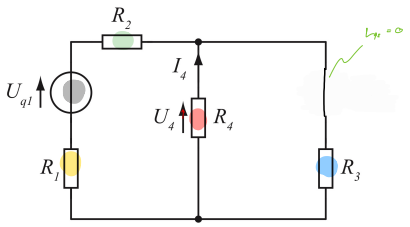
Superposition :

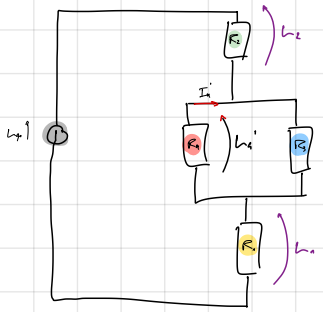
$$U_4 = U_4' + U_4'' = -2V$$

$$I_4 = I_4' + I_4'' = -\frac{1}{2}A$$

Übung 3.1

Einfluss Quelle 1 :

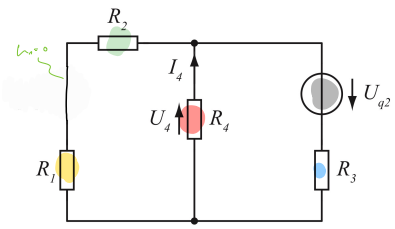


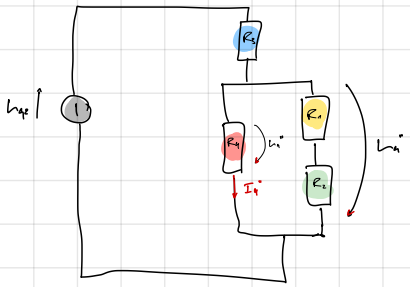


Spannungsteiler : $U_4' = \frac{(R_3 \parallel R_4)}{(R_3 \parallel R_4) + R_1 + R_2} \cdot U_{q1} = 4V$

LRI : $I_4' = \frac{U_4'}{R_4} = 1A$

Einfluss Quelle 2 :





Spannungsteiler : $-U_4'' = \frac{[(R_1 + R_2) \parallel R_4]}{[(R_1 + R_2) \parallel R_4] + R_3} \cdot U_{q2}$

$\Leftrightarrow U_4'' = -\frac{[(R_1 + R_2) \parallel R_4]}{[(R_1 + R_2) \parallel R_4] + R_3} \cdot U_{q2} = -6V$

LRI : $I_4'' = \frac{U_4''}{R_4} = -1.5A$

Superposition : $U_4 = U_4' + U_4'' = -2V$

$I_4 = I_4' + I_4'' = -\frac{1}{2}A$