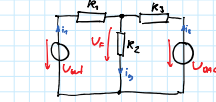
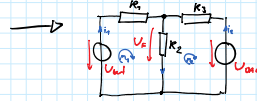
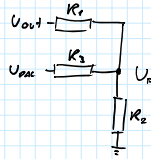
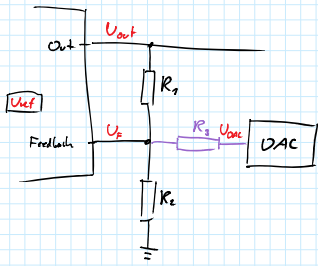


Netzteil-Steuerung

Montag, 1. Februar 2016 09:14



$$\begin{aligned}
 M_1: -U_{out} + R_1 \cdot i_1 + R_2 \cdot (i_1 + i_2) &= 0 \\
 -U_{out} + R_1 \cdot i_1 + R_2 \cdot i_1 + R_2 \cdot i_2 &= 0 \\
 -U_{out} + i_1(R_1 + R_2) + i_2 \cdot R_2 &= 0 \\
 i_2 \cdot R_2 &= U_{out} - i_1(R_1 + R_2) \\
 i_2 &= \frac{U_{out} - i_1(R_1 + R_2)}{R_2}
 \end{aligned}$$

$$U_{DAC} = 0$$



$$\begin{aligned}
 M_2: U_{DAC} - R_2 \cdot (i_1 + i_2) - R_3 \cdot i_2 &= 0 \\
 U_{DAC} - R_2 \cdot i_1 - R_2 \cdot i_2 - R_3 \cdot i_2 &= 0 \\
 U_{DAC} - i_1 \cdot R_2 - i_2(R_2 + R_3) &= 0
 \end{aligned}$$

i_2 einsetzen nach i_1 auflösen

$$U_{DAC} - i_1 \cdot R_2 - \frac{U_{out} - i_1(R_1 + R_2)}{R_2} \cdot (R_2 + R_3) = 0$$

$$U_{DAC} - i_1 \cdot R_2 - \left[U_{out} - i_1(R_1 + R_2) + \frac{R_3}{R_2} (U_{out} - i_1(R_1 + R_2)) \right] = 0$$

$$U_{DAC} - i_1 \cdot R_2 - U_{out} + i_1(R_1 + R_2) - \frac{R_3}{R_2} \cdot U_{out} + i_1 \cdot \frac{R_3}{R_2} (R_1 + R_2) = 0$$

$$U_{DAC} + i_1 \left(R_1 + R_2 + \frac{R_3}{R_2} (R_1 + R_2) \right) - U_{out} \left(1 + \frac{R_3}{R_2} \right) = 0$$

$$i_1 \cdot \left(R_1 + R_2 + \frac{R_3}{R_2} (R_1 + R_2) \right) = U_{out} \left(1 + \frac{R_3}{R_2} \right) - U_{DAC}$$

$$i_1 = \frac{U_{out} \left(1 + \frac{R_3}{R_2} \right) - U_{DAC}}{R_1 + R_2 + \frac{R_3}{R_2} (R_1 + R_2)} = \frac{U_{out} (R_2 + R_3) - U_{DAC} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3}$$

$$i_2 = \frac{U_{out} - i_1(R_1 + R_2)}{R_2}$$

$$= \frac{U_{out} - \left(\frac{U_{out} (R_2 + R_3) - U_{DAC} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3} \right) \cdot (R_1 + R_2)}{R_2}$$

$$= \frac{U_{out}}{R_2} - \left(\frac{U_{out} (R_2 + R_3) - U_{DAC} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3} \right) \cdot \frac{(R_1 + R_2)}{R_2}$$

$$= \frac{U_{out}}{R_2} - \left(\frac{U_{out} (R_2 + R_3) - U_{DAC} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3} \right) \cdot \left(\frac{R_2}{R_2} + 1 \right)$$

$$= \frac{U_{out}}{R_2} - \frac{U_{out} (R_2 + R_3) \cdot \frac{R_2}{R_2} + 1}{R_1 R_2 + R_2 R_3 + R_1 R_3} + \frac{U_{DAC} \cdot R_2 \cdot \left(\frac{R_2}{R_2} + 1 \right)}{R_1 R_2 + R_2 R_3 + R_1 R_3}$$

$$= \frac{U_{out}}{R_2} - \frac{U_{out} \left(R_1 + R_2 + \frac{R_1 R_3}{R_2} + R_3 \right)}{R_1 R_2 + R_2 R_3 + R_1 R_3} + \frac{U_{DAC} \cdot (R_1 + R_2)}{R_1 R_2 + R_2 R_3 + R_1 R_3}$$

$$= \frac{U_{out}}{R_2} - \left(\frac{U_{out} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3} + \frac{U_{out} \cdot \left(R_1 R_2 + R_1 R_3 + R_2 R_3 \right)}{R_1 R_2 + R_2 R_3 + R_1 R_3} \right) + \frac{U_{DAC} \cdot (R_1 + R_2)}{R_1 R_2 + R_2 R_3 + R_1 R_3}$$

$$= \frac{U_{DAC} \cdot (R_1 + R_2)}{R_1 R_2 + R_2 R_3 + R_1 R_3} - \frac{U_{out} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3}$$

$$= \frac{U_{DAC} (R_1 + R_2) - U_{out} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3}$$

$$i_1 = \frac{U_{out} (R_2 + R_3) - U_{DAC} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3}$$

$$i_2 = \frac{U_{DAC} (R_1 + R_2) - U_{out} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3}$$

$$U_F = (i_1 + i_2) \cdot R_2$$

$$= \left(\frac{U_{out} (R_2 + R_3) - U_{DAC} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3} + \frac{U_{DAC} (R_1 + R_2) - U_{out} \cdot R_2}{R_1 R_2 + R_2 R_3 + R_1 R_3} \right) \cdot R_2$$

$$= \left(\frac{U_{out} (R_2 + R_3) - U_{in} \cdot R_2 + U_{anc} (R_1 + R_2) - U_{dac} \cdot R_1}{R_1 R_2 + R_1 R_3 + R_2 R_3} \right) \cdot R_2$$

$$= \frac{U_{out} \cdot R_3 + U_{anc} \cdot R_1}{R_1 R_2 + R_1 R_3 + R_2 R_3} \cdot R_2$$
