3. Aufgabe



$f = 1{,}13\,\text{kHz} \rightarrow \omega = 7{,}1 \cdot 10^3\,\frac{1}{s}$

a) $\underline{Z} = R_r + j\omega L_r = \dfrac{1}{\frac{1}{R_p} + \frac{1}{j\omega L_p}}$ (2)

$\Rightarrow \dfrac{1}{R_p} + \dfrac{1}{j\omega L_p} = \dfrac{1}{R_p} - j\dfrac{1}{\omega L_p} = \dfrac{1}{R_r + j\omega L_r} = \dfrac{R_r - j\omega L_r}{R_r^2 + (\omega L_r)^2}$

$\rightarrow \dfrac{1}{R_p} = \dfrac{R_r}{R_r^2 + (\omega L_r)^2}$ (3) $\qquad \rightarrow \dfrac{1}{\omega L_p} = \dfrac{\omega L_r}{R_r^2 + (\omega L_r)^2}$ (3)

$R_p = R_r + \dfrac{(\omega L_r)^2}{R_r}$ $\qquad R_r^2 + (\omega L_r)^2 = \omega^2 L_r L_p$

$R_p = 2{,}75\,\text{k}\Omega + \dfrac{(7{,}1 \cdot 10^3 \cdot 0{,}3^2)\,\Omega^2}{2750\,\Omega}$ $\qquad R_r^2 = \omega^2 L_r (L_p - L_r)$

$R_r = \omega \cdot \sqrt{L_r (L_p - L_r)}$

$R_r = 7{,}1 \cdot 10^3\,\frac{1}{s} \cdot \sqrt{0{,}3 \cdot (0{,}8 - 0{,}3)}\,\frac{V_s}{A}$

$\underline{R_p = 4{,}40\,\text{k}\Omega}$ (3) $\qquad \underline{R_r = 2{,}75\,\text{k}\Omega}$ (4)

b)

