

12.4.11

$$\frac{U_P}{I_P} = Z_L \quad \frac{U_A}{I_A} = Z_A$$

$$U_P(z=l) + U_r(z=l) = U_A \quad r(z=l) = \frac{U_r(z=l)}{U_P(z=l)}$$

$$I_P(z=l) + I_r(z=l) = I_A = \frac{Z_L I_r(z=l)}{Z_L I_P(z=l)}$$

ebenso:

$$U_P(z=l) = U_P(z=0) e^{-j\beta l} \quad (\alpha \text{ vernachlässigt})$$

$$U_r(z=0) = U_r(z=l) e^{-j\beta l}$$

$$Z_E = \frac{U(z=0)}{I(z=0)} = \frac{U_P(z=0) + U_r(z=0)}{I_P(z=0) - I_r(z=0)} = \frac{U_P(z=0) (1 + r(z=0))}{I_P(z=0) (1 - r(z=0))} = Z_L$$

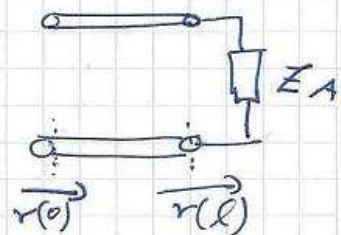
$$\Rightarrow Z_E = Z_L \frac{1+r}{1-r} \quad \parallel \quad Z_A = Z_L \frac{1+r(l)}{1-r(l)} \quad \text{normiertes "klein" } Z$$

$$\Rightarrow r(z) = \frac{\frac{Z(z)}{Z_L} - 1}{\frac{Z(z)}{Z_L} + 1} = \left| \frac{Z(z) - Z_L}{Z(z) + Z_L} \right|$$

$$r(z=l) \stackrel{!}{=} r(z=0) \Rightarrow \frac{U_r(z=l)}{U_P(z=l)} = \frac{U_r(z=0) e^{j\beta l}}{U_P(z=0) e^{-j\beta l}} = \frac{U_r(z=0)}{U_P(z=0)} e^{2j\beta l}$$

$$\Rightarrow r(z=l) = r(z=0) e^{2j\beta l}$$

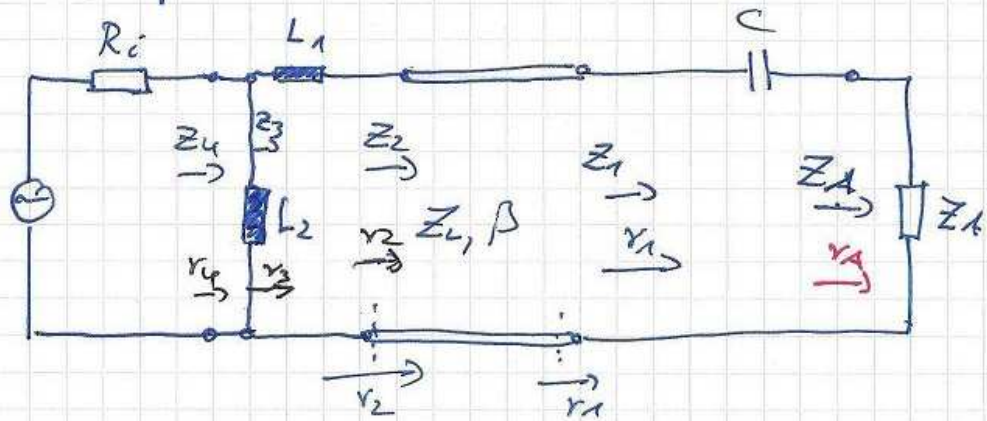
$$Z_E = \frac{Z_A + j Z_L \tan(\beta L)}{1 + j \frac{Z_A}{Z_L} \tan(\beta L)}$$



$$r(l) = \frac{\frac{Z_A}{Z_L} - 1}{\frac{Z_A}{Z_L} + 1} \quad \downarrow \quad r(l) \xrightarrow{r(0) = r(l) e^{-2j\beta l}} r(0)$$

$$Z_E = Z_L \frac{1+r(0)}{1-r(0)} \quad (3 \text{ Schritte})$$

Beispiel



$$1) R_N = Z_L$$

$$2) \frac{Z_A}{Z_L} \text{ einzeichnen } \left(\frac{Z_A}{Z_L} = 2 + j1 \right)$$

$$3) -j \frac{1}{\omega C Z_L} \text{ addieren } \left(-\frac{1}{\omega C Z_L} = -3 \right)$$

$$4) \text{ Transformation über Leitung der Länge } \frac{l}{\lambda} = 0,1$$

$$5) j \frac{\omega L_1}{Z_L} \text{ addieren } \left(\frac{\omega L_1}{Z_L} = 2 \right)$$

$$6) Z \rightarrow Y$$

$$7) -j \frac{Z_L}{\omega L} \text{ addieren } \left(-\frac{Z_L}{\omega L} = -2 \right)$$

$$8) Y \rightarrow Z$$

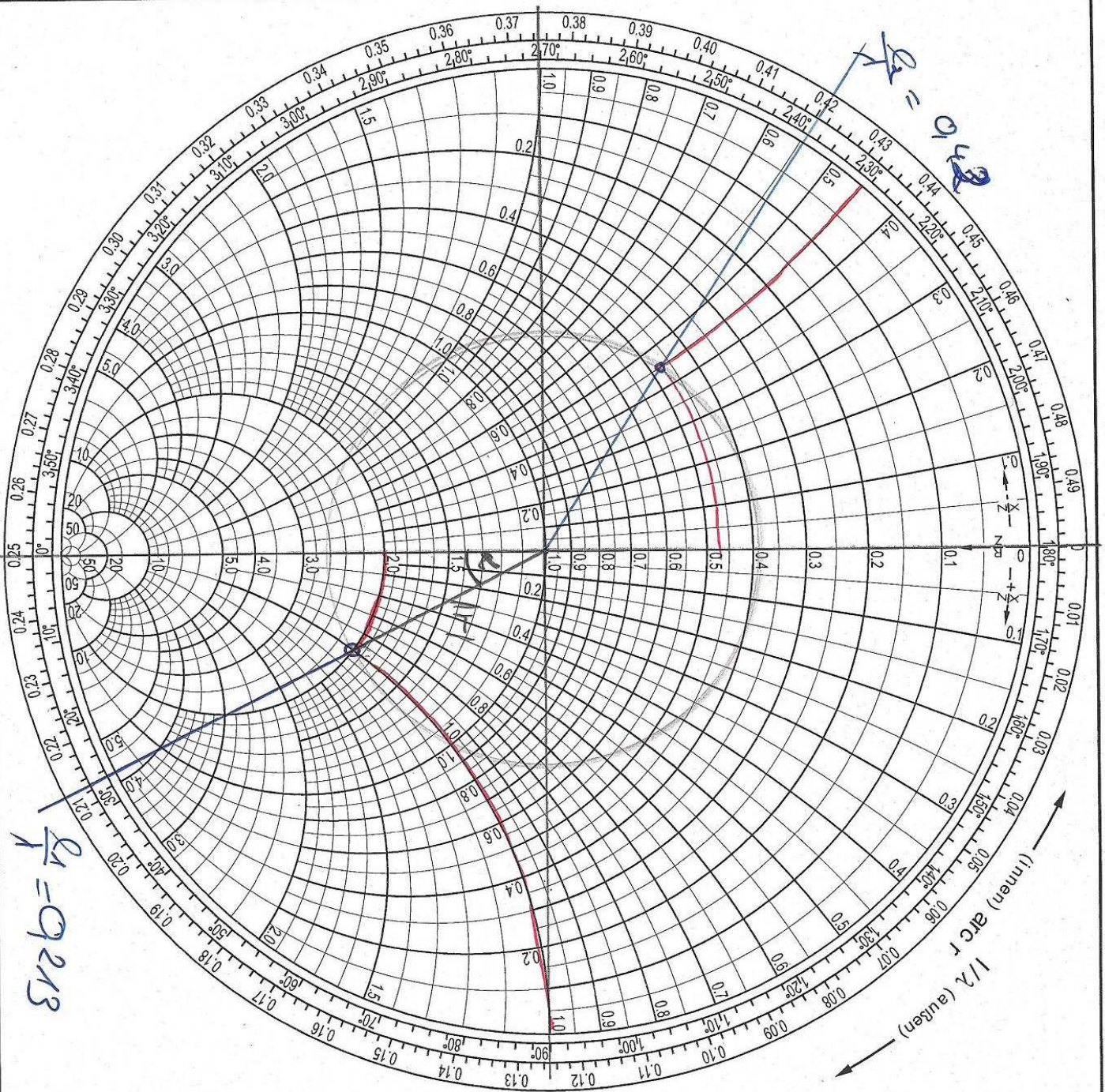
Name: _____

Smith-Diagramm
(Widerstandsform)

Zu Aufgabe

Nr.:

Normierungs-
widerstand
 $R_N =$



Erläuterungen zum Transformationsweg:

Name: _____

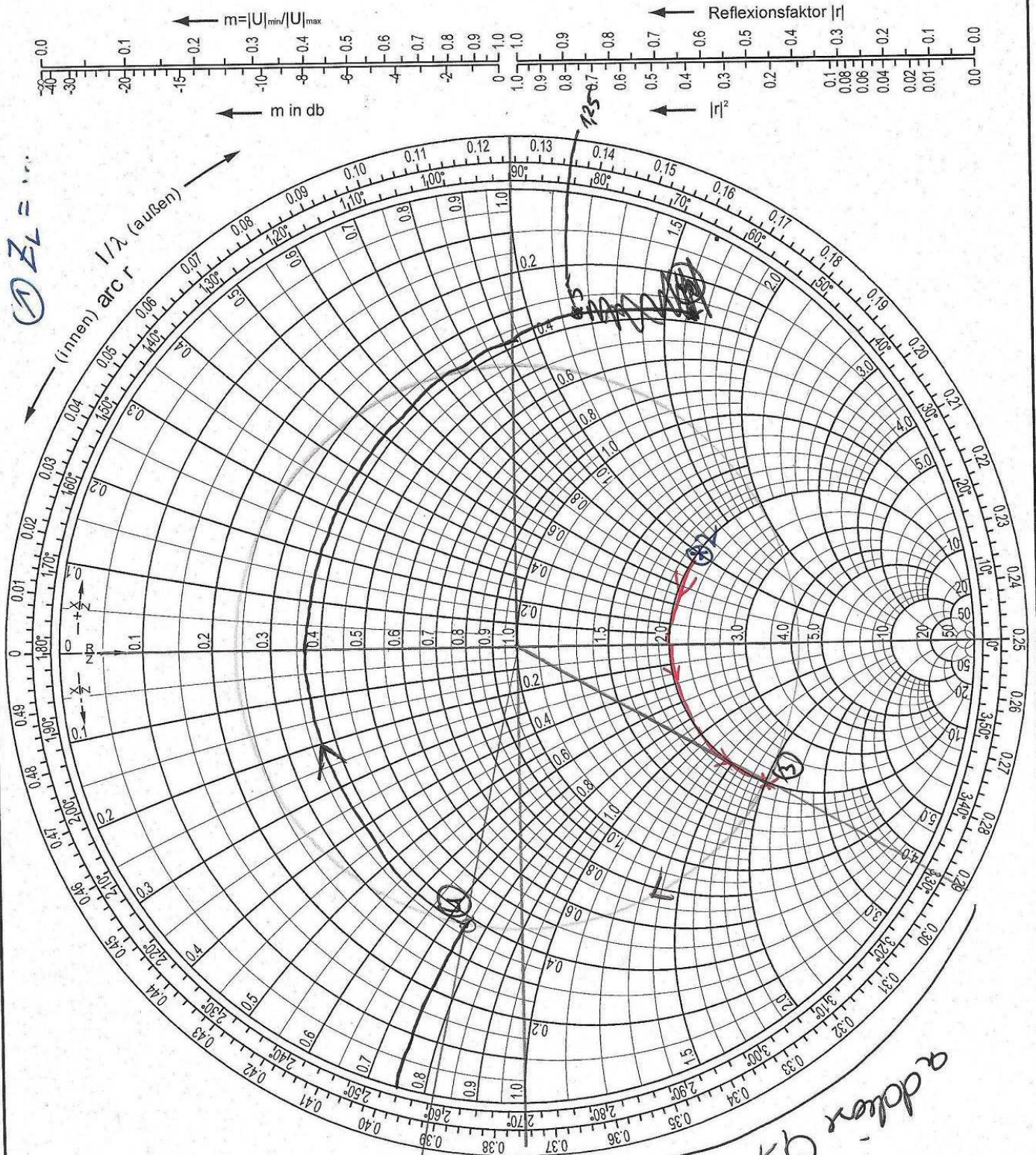
Smith-Diagramm (Widerstandsform)

Zu Aufgabe _____

Nr.: _____

Normierungs-
widerstand

$R_N =$ _____



Erläuterungen zum Transformationsweg:

$15.12 = 10 \times 1.5$
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