

BEISPIEL: VON ZEITBEREICH IN FREIQUENZBEREICH - UND UMGEKART

ZEITBEREICH

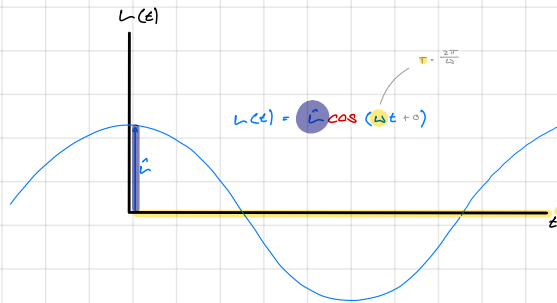
$$L(t) = L \cos(\omega t + \varphi) \quad \varphi \in \mathbb{R}$$

ROTIERENDER ZEIGER

$$\underline{\hat{L}} = L e^{j\omega t + j\varphi} = L e^{j\varphi} e^{j\omega t} \quad \varphi \in \mathbb{C}, t \in \mathbb{R}$$

STILLER ZEIGER

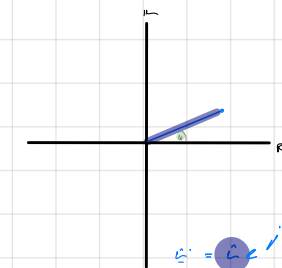
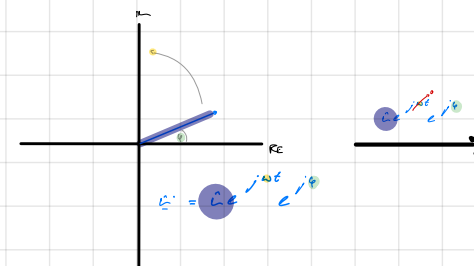
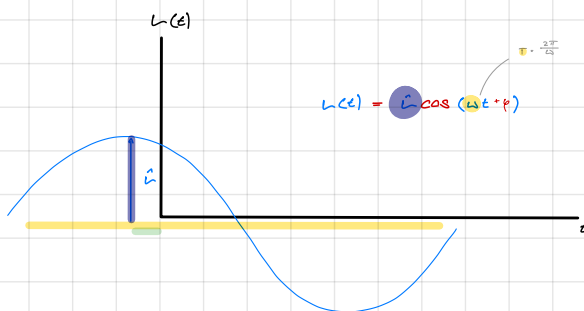
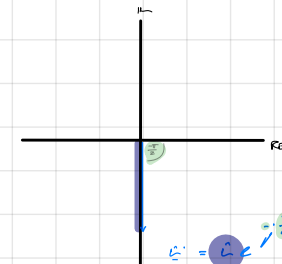
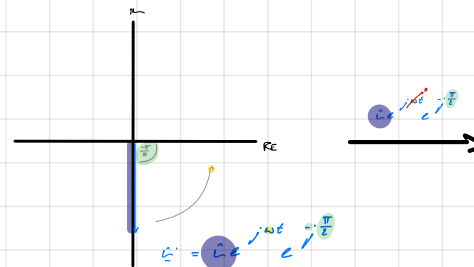
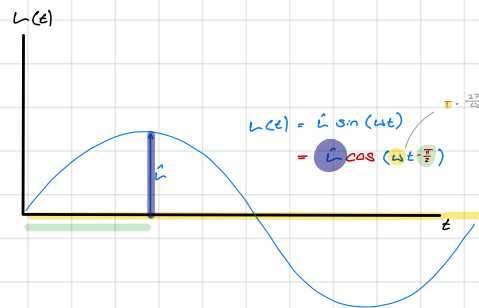
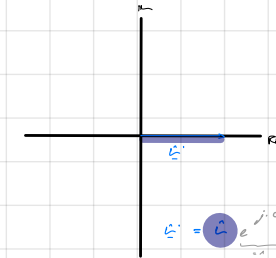
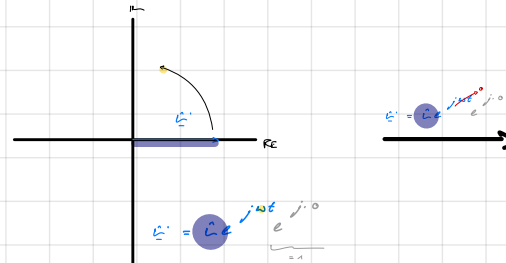
$$\underline{\hat{L}} = L e^{j\varphi} \quad \varphi \in \mathbb{C}$$



WIR FÜHREN EIN
SKALAR IN ZEITBEREICH
ALS RECHTEN FAKTOR
VON EINER ROTIERENDEM
ZEIGER AUF.

$$L(t) = \text{Re} \{ \underline{\hat{L}} e^{j\omega t} \}$$

WÄCHSTEN SEITE



ZEITBEREICH

$$u(t) = 2 \cos(\omega t + \varphi) \quad \text{in } \mathbb{R}$$

ROTIERENDER ZEIGER

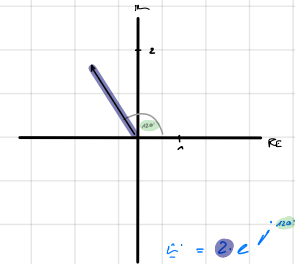
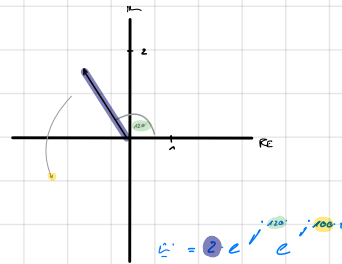
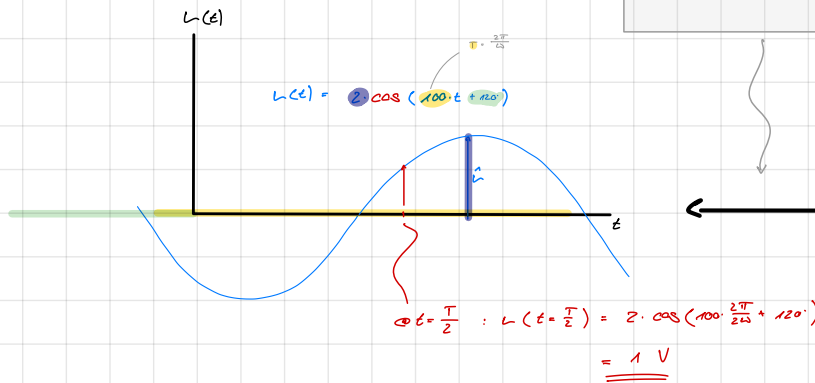
$$\underline{\hat{u}} = 2 e^{j\omega t + j\varphi} \quad \text{in } \mathbb{C}, t \in \mathbb{R}$$

STILLER ZEIGER

$$\underline{\hat{u}} = 2 e^{j\varphi} \quad \text{in } \mathbb{C}$$

GEFESSEN: $\hat{u} = 2 \text{ V}$ und $\omega = 100 \text{ Hz}$

$$\begin{aligned} \operatorname{Re}\{\underline{\hat{u}}\} &= \operatorname{Re}\{2 e^{j120^\circ} e^{j100t}\} \\ &= \operatorname{Re}\{2 \cdot \cos(100t + 120^\circ)\} \\ &= \operatorname{Re}\{2 [\cos(\dots) + j \sin(\dots)]\} \\ &= 2 \cdot \cos(100t + 120^\circ) \end{aligned}$$



zu t=0 WERT von $\underline{\hat{u}}$
 $\underline{\hat{u}} = -1 + j1.73 = 2 e^{j120^\circ}$
 (25 ALS EINE MAGNITUDE)