3 Dispersion durch ein Elektronengas

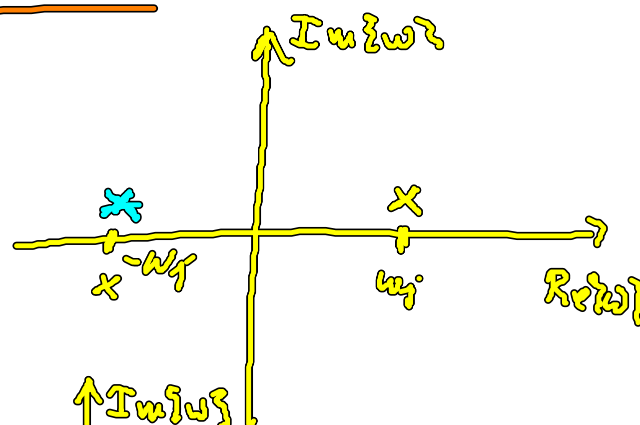
$$\dot{v} = -\frac{1}{\tau} v \implies v(t) = v(0) \exp\left\{-\frac{t}{\tau}\right\}$$

Kristall: $E_L = \frac{\hbar^2 \vec{k}^2}{2m^*} \implies \hbar \vec{k} = m^* \vec{v}$ Impuls

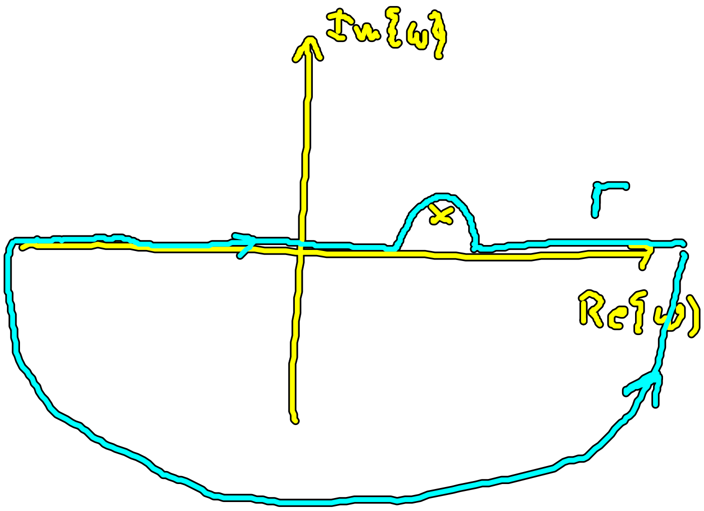
Driftgeschwindigkeit $\vec{j} = -\sigma E = -e_0 n \vec{v}_D \Rightarrow \vec{v}_D = \frac{\sigma}{e_0 n} E$

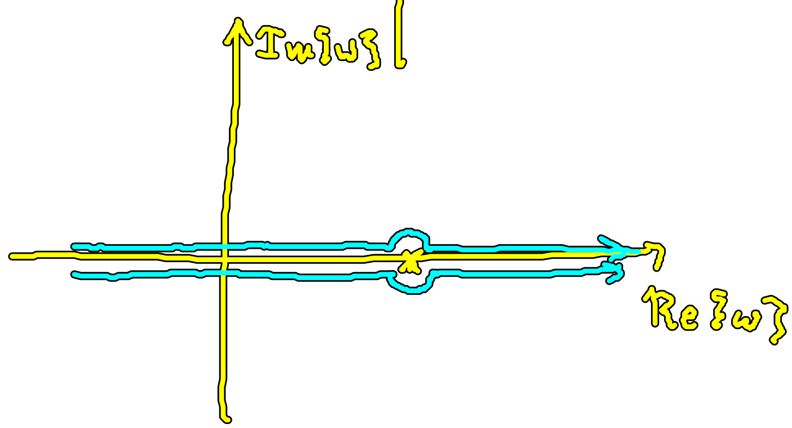
thermische Geschwindigkeit : $\frac{1}{2} m v_{th}^2 = \frac{3}{2} k_B T$

$$f(\omega) = \frac{Ne^2}{\varepsilon_0 m} \sum_j \frac{f_j}{\omega_j^2 - \omega^2 + i\omega\gamma_j}$$



$$\omega = \pm\sqrt{\omega_j^2 + i\omega\gamma_j}$$





$$P\int_{-\infty}^{+\infty} \cdots = \frac{1}{2}\int \cdots + \frac{1}{2}\int \cdots$$

$$P\int_{-\infty}^{+\infty} f(x)\,dx = \lim_{\varepsilon \to 0}\left[\int_{-\infty}^{x_0-\varepsilon} f(x)\,dx + \int_{x_0+\varepsilon}^{\infty} f(x)\,dx\right]$$

x_0

$$-\frac{1}{\pi i} P\int_{-\infty}^{0} \frac{\omega' f(\omega')\,d\omega'}{\omega'^2 - \omega^2} = \frac{-1}{i\pi} P\int_{\infty}^{0} \frac{\omega' f(-\omega')\,d\omega'}{\omega'^2 - \omega^2} = \frac{-1}{i\pi} P\int_{0}^{\infty} \frac{-\omega' f^*(\omega')\,d\omega'}{\omega'^2 - \omega^2}$$