

Aufgabe 10

$$a) \quad \frac{x_{21}}{x_1} = \frac{1}{2}$$

$$\frac{1}{q} = \frac{x_2}{x_1} = ?$$

$$\frac{x_2}{x_1} = \frac{x_2}{x_2} = \frac{x_2}{x_1} = \frac{1}{q}$$

$$\frac{x_{21}}{x_1} = \frac{x_{21}}{x_{20}} \cdot \frac{x_{20}}{x_{19}} \cdot \frac{x_{19}}{x_{18}} \cdot \dots \cdot \frac{x_2}{x_1} = \frac{1}{q^{20}} = \frac{1}{2}$$

$$\Rightarrow q^{20} = 2 \Rightarrow q = \sqrt[20]{2} = 2^{1/20} = 1.035$$

$$\delta \cdot T = \ln q \quad \text{mit } q \text{ und } T = 25$$

$$\Rightarrow \delta = \frac{1}{T} \ln q = 0.01733 \frac{1}{s}$$

$$b.) \quad \omega_0 \text{ gesucht.} \quad \omega^2 = \omega_0^2 - \delta^2 \quad \omega = \frac{2\pi}{T} = \dots$$

$$\omega_0 = \sqrt{\omega^2 + \delta^2} = 3.14164 \frac{1}{s}$$

$$T_0 = \frac{2\pi}{\omega_0} = 1.99997 \text{ s}$$