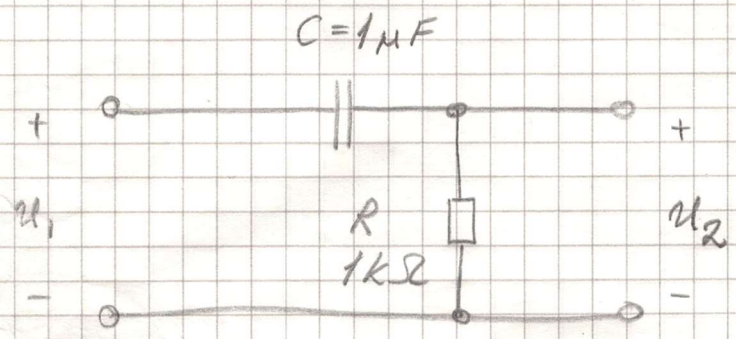


EX

HÖRPASSFILTER



RITA FILTERETS BODEDIAGRAM OCH ANGE GRÄNSFREKVENSEN.

BODEDIAGRAM BESTÅR AV ¹⁾AMPLITUDKURVA OCH ²⁾FASKURVA.

1) SPÄNNINGSDELNINGSLAGEN →

$$U_2 = U_1 \cdot \frac{R}{\frac{1}{j\omega C} + R} \Rightarrow$$

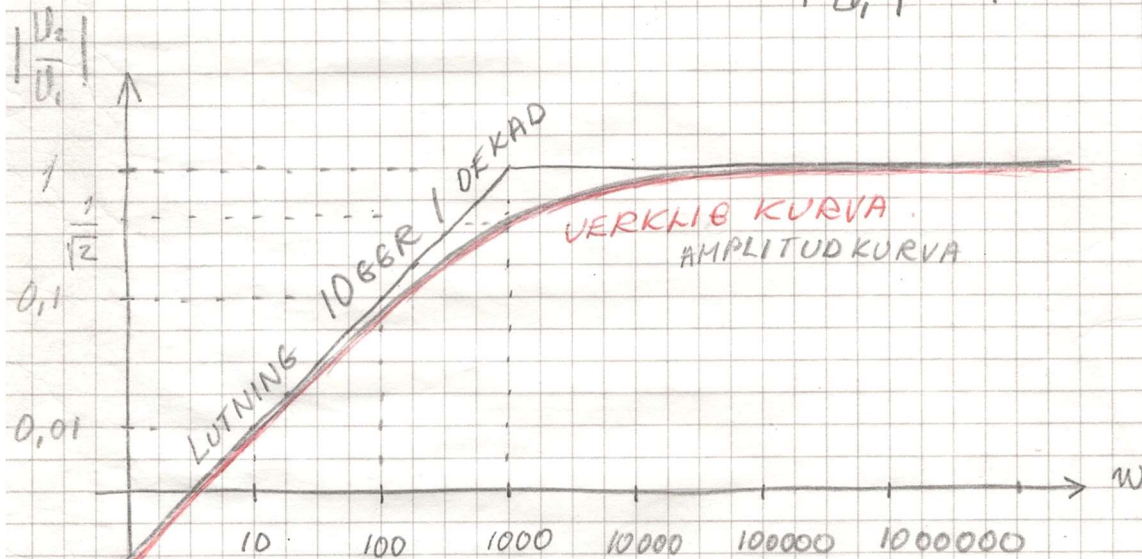
$$\frac{U_2}{U_1} = \frac{j\omega CR}{1 + j\omega CR} = \left/ \begin{array}{l} C = 1 \mu F \\ R = 1 k\Omega \end{array} \right/ =$$

$$= \frac{j \frac{\omega}{1000}}{1 + j \frac{\omega}{1000}}$$

$$\left| \frac{U_2}{U_1} \right| = \frac{\frac{\omega}{1000}}{\sqrt{1^2 + \left(\frac{\omega}{1000} \right)^2}} \dots \dots (1)$$

FÖR $\omega \ll 1000 \frac{\text{RAD}}{\text{S}}$ BLIR $\left| \frac{U_2}{U_1} \right| \approx \frac{\omega}{1000}$

FÖR $\omega \gg 1000 \frac{\text{RAD}}{\text{S}}$ BLIR $\left| \frac{U_2}{U_1} \right| \approx 1$



$$\omega_n = 2\pi f_n \rightarrow f_n = \frac{1000}{2\pi} = 159 \text{ Hz}$$

$$\omega = 1000 \frac{\text{RAD}}{\text{S}} \text{ INS I (1)} \rightarrow \left| \frac{U_2}{U_1} \right| = \frac{1}{\sqrt{2}}$$

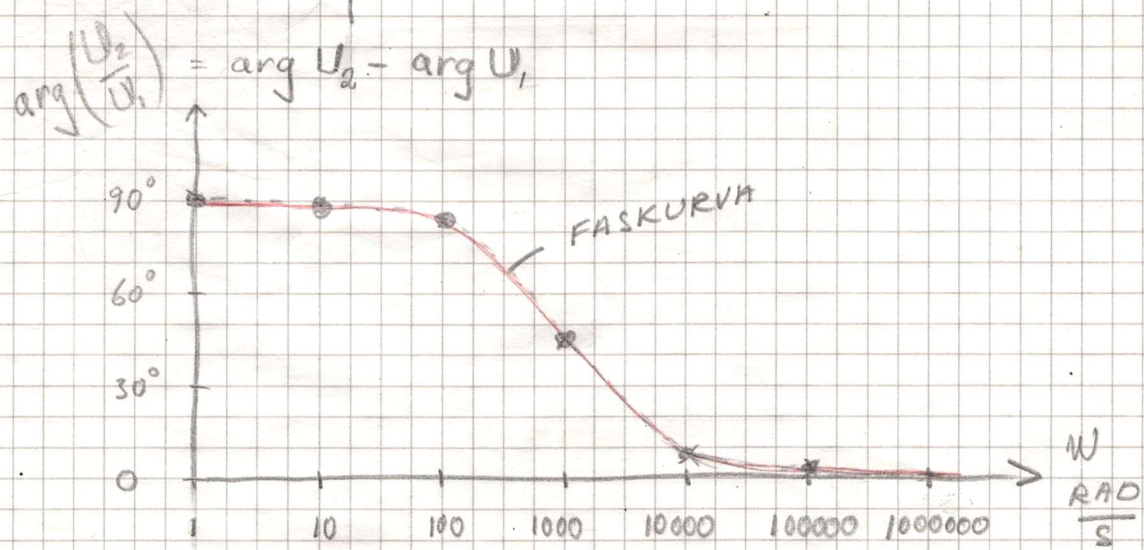
GENERELLT GÄLLER $\omega = \omega_n$ DÄR $\left| \frac{U_2}{U_1} \right| = \frac{\left| \frac{U_2}{U_1} \right|_{\text{MAX}}}{\sqrt{2}}$

2)

$$\arg\left(\frac{U_2}{U_1}\right) = \arg \frac{j \frac{\omega}{1000}}{1 + j \frac{\omega}{1000}} =$$

$$= \underbrace{\arg\left(j \frac{\omega}{1000}\right)}_{90^\circ} - \underbrace{\arg\left(1 + j \frac{\omega}{1000}\right)}_{\arctan \frac{\omega}{1000}}$$

ω	$\arg\left(\frac{U_2}{U_1}\right) = \arg U_2 - \arg U_1$
1	90°
10	89°
100	84°
1000	45°
10000	6°
100000	1°
1000000	0°



ÖVNING: BYT PLATS PÅ C & R (LÅGPASSFILT)