

TSKS21 Facit till lektion 2

$$10. a) i(t) = \sqrt{\frac{1}{R^2} + \frac{1}{(\omega L)^2}} \hat{U}_0 \sin(\omega t - \arctan(\frac{R}{\omega L}))$$

$$b) i(t) = \sqrt{\frac{1}{R^2} + (\omega C)^2} \hat{U}_0 \sin(\omega t + \arctan(\omega RC))$$

$$c) i(t) = \frac{\hat{U}_0}{\sqrt{R^2 + (\frac{\omega L}{1 - \omega^2 LC})^2}} \sin(\omega t + \arctan(\frac{\omega L}{R(\omega^2 LC - 1)}))$$

$$11. a) u(t) = \sqrt{R^2 + (\omega L)^2} \hat{I}_0 \sin(\omega t + \arctan(\frac{\omega L}{R}))$$

$$b) u(t) = \sqrt{R^2 + \frac{1}{(\omega C)^2}} \frac{\hat{I}_0}{2} \sin(\omega t + \arctan(\frac{1}{\omega RC}))$$

$$12. a \text{ och } b) \omega = \frac{1}{\sqrt{LC}}$$

$$13. L/C = R^2 = 64 \Omega^2$$

$$14. a) H(\omega) = \frac{j\omega RC}{1 + j\omega RC}, \text{ HP, } \omega_0 = \frac{1}{RC}$$

$$b) H(\omega) = \frac{j\omega L}{R + j\omega L}, \text{ HP, } \omega_0 = R/L$$

$$c) H(\omega) = \frac{R}{R + j\omega L}, \text{ LP, } \omega_0 = R/L$$

$$d) H(\omega) = \frac{R}{R + j(\omega L - \frac{1}{\omega C})}, \text{ BP, } \omega_{1,2} = \sqrt{(\frac{R}{2L})^2 + \frac{1}{LC}} \pm \frac{R}{2L}$$

$$15 a) P = \frac{R \hat{U}_0^2}{2(R^2 + (\frac{\omega L}{1 - \omega^2 LC})^2)}, \quad Q = \frac{\hat{U}_0 \omega L / (1 - \omega^2 LC)}{2(R^2 + (\frac{\omega L}{1 - \omega^2 LC})^2)}$$

$$b) P = \frac{\hat{I}_0^2 / 2R}{\frac{1}{R^2} + (\frac{\omega C}{1 - \omega^2 LC})^2}, \quad Q = \frac{\hat{I}_0^2 / (2 \frac{\omega C}{1 - \omega^2 LC})}{\frac{1}{R^2} + (\frac{\omega C}{1 - \omega^2 LC})^2}$$