Svar på lektionsuppgifterna – TSDT18/84 Signaler & System

Lektion 7

4.7-1 **(a)** Se lösningsförslaget **(b)** $H_{\text{tot}}(0)=0.1$

(c) $H_{\text{tot}}(0)=10$ **(d)** Se lösningsförslaget

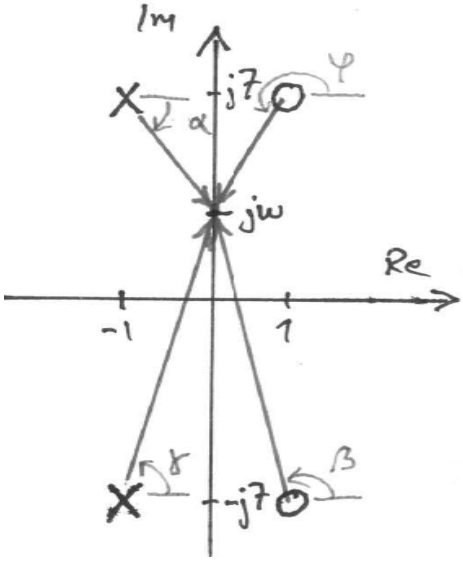
4.8-1 **(a)** $y(t)=\sqrt{2}\cos\left(2t-\frac{\pi}{12}\right)$ **(b)** $y(t)=2\sqrt{2}\cos(2t)$ **(c)** $y(t)\approx 2.3\cos(2t-0.21)$

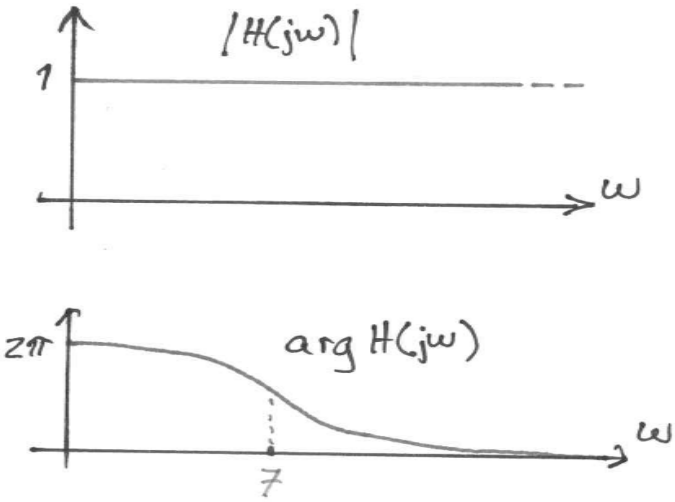
4.8-2 **(a)** $y(t)=y_\phi(t)=\frac{15}{2}u(t)$ **(b)** $y(t)=y_\phi(t)\approx\frac{\sqrt{13}}{8}\cos\left(2t+3.7\frac{\pi}{180}\right)u(t)$

4.8-4 **(a)** $k=-\frac{5}{9},\ b_1=0,\ b_2=\frac{9}{4},\ a_1=2,\ a_2=\frac{5}{4}$

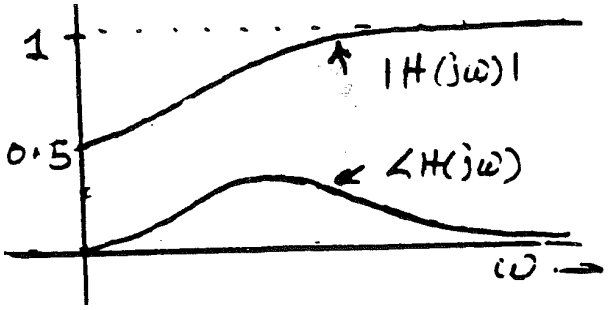
(b) $y(t)=-4+\frac{10}{9\sqrt{2}}\cos\left(\frac{t}{2}+\frac{13\pi}{12}\right)$

4.10-1 Systemet är ett allpassfilter:





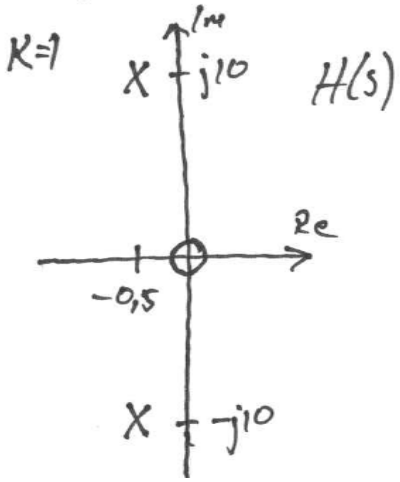
4.10-2 **(a)**

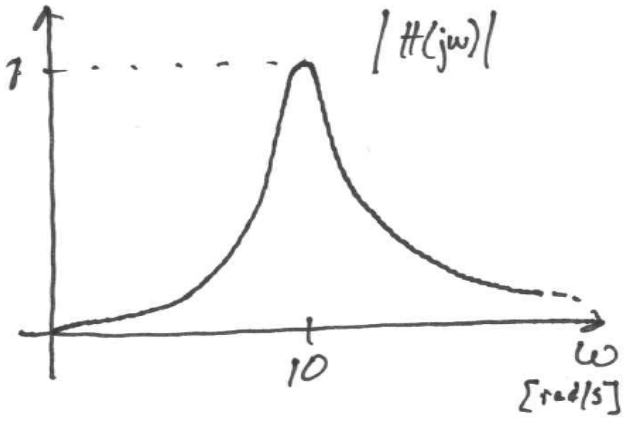


4.10-3 $H(s)=\dfrac{s}{s^2+2as+\left(100+a^2\right)}$ Se lösningen för resonemang om hur värdet på *a* påverkar frekvensfunktionen (speciellt amplitudkaraktäristiken).

Tilläggsuppgifter:

$H(j10)=H(10)=1$ då $a\approx 0.5$





4.11-5 **(a)** $y(t)=\left(-\dfrac{4}{3}e^{-t}+2e^{-t/2}\right)u(t)+\dfrac{2}{3}e^{t/2}u_0(-t)$

(b) $y(t)=\left(-\dfrac{1}{6}e^{-t}+\dfrac{1}{2}e^{t}\right)u(t)+\dfrac{1}{3}e^{2t}u_0(-t)$

(d) $y(t)=\left(\dfrac{1}{6}e^{-t}+\dfrac{1}{3}e^{2t}\right)u(t)+\dfrac{1}{2}e^{t}u_0(-t)$