Results

Problem 1

A6b, B5e, C3c, D2g, E1d, F7a, G4f

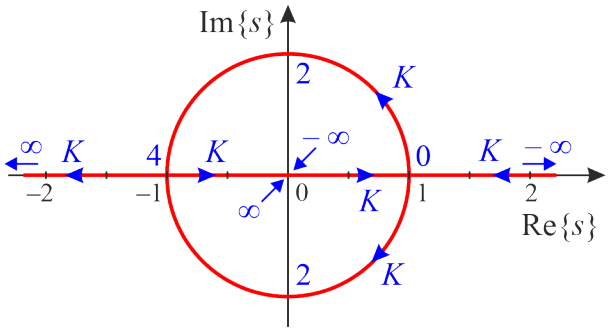
Problem 2

2.1 $R(f)=\text{rect}\left(\frac{f+1}{4}\right)+\text{rect}\left(\frac{f-1}{4}\right)$

2.2 $y(t)=2+3\cdot\sin\left(4\pi\cdot t\right)$

Problem 3

3.1



3.2 $K>2$

3.3 $0<K<4$

3.4 $y(t)=t\cdot\mathrm{e}^{-t}\cdot u\left(t\right)$

Problem 4

$f_\mathrm{s}\geq 6$ kHz

Problem 5

$$y[n]-\frac{7}{12}\cdot y[n-1]+\frac{1}{12}\cdot y[n-2]=x[n]-\frac{1}{2}\cdot x[n-1]$$

Problem 6

6.1 stable and causal

6.2 $H(z)=H_\mathrm{M}(z)\cdot H_\mathrm{A}(z)$; $H_\mathrm{M}(z)=-2\cdot\frac{1+z^{-1}}{1+\frac{3}{4}\cdot z^{-1}}=-2\cdot\frac{z+1}{z+\frac{3}{4}}$; $H_\mathrm{A}(z)=\frac{1-2\cdot z^{-1}}{z^{-1}-2}=\frac{z-2}{1-2\cdot z}$

6.3 $h[n]=\frac{16}{3}\cdot\delta[n]-\frac{1}{15}\cdot\left\{11\cdot\left(-\frac{3}{4}\right)^n+54\cdot\left(\frac{1}{2}\right)^n\right\}\cdot u[n]$

$h[0]=1=\lim\limits_{z\to\infty}H(z)$

Problem 7

7.1 12-point DFT: $X[k]=6\cdot\delta[k-2]+6\cdot\delta[k-10]$

7.2 6-point DFT: $X[k]=3\cdot\delta[k-1]+3\cdot\delta[k-5]$

16-point DFT: leakage