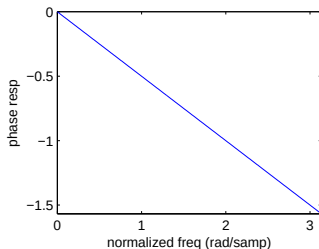
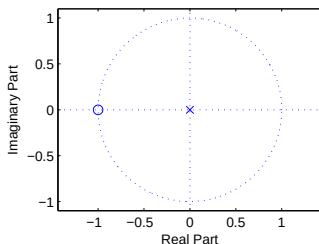
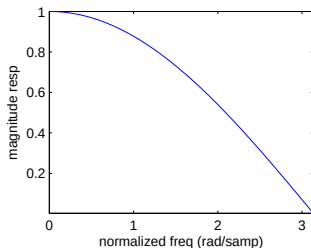
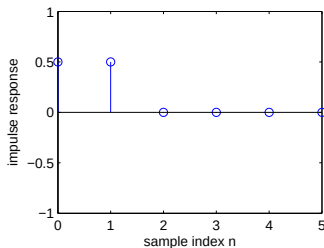


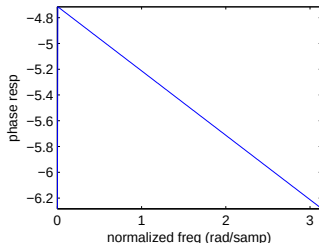
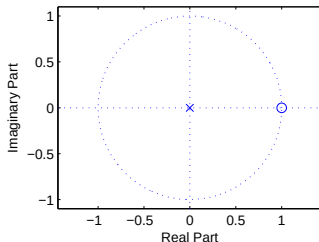
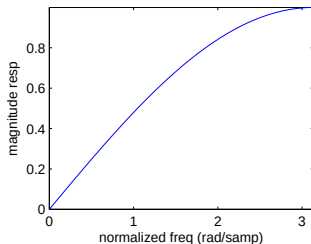
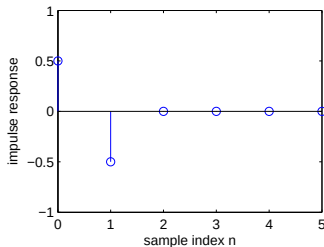
Digital Signal Processing Simple Filtering Examples

D. Richard Brown III

Simple Filtering I: Lowpass FIR $H(z) = \frac{1}{2}(1 + z^{-1}) = \frac{z+1}{2z}$

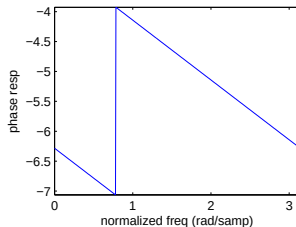
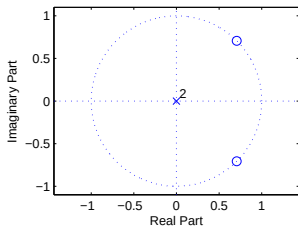
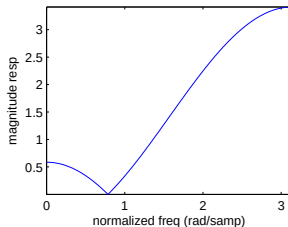
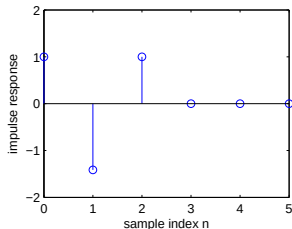


Simple Filtering II: Highpass FIR $H(z) = \frac{1}{2}(1 - z^{-1}) = \frac{z-1}{2z}$



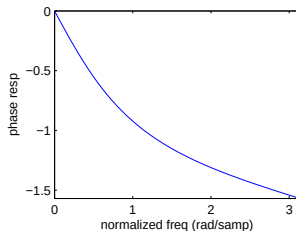
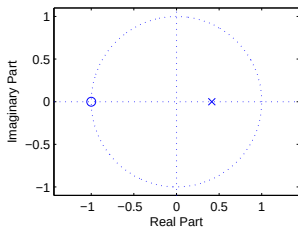
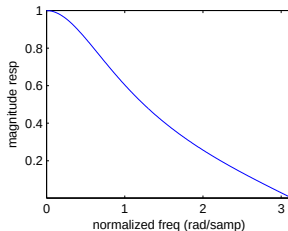
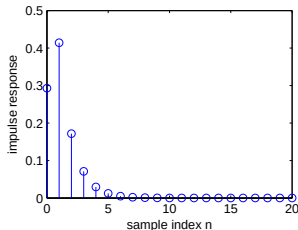
Simple Filtering III: Notch FIR

$$H(z) = 1 - 2\cos(\omega_0)z^{-1} + z^{-2} = \frac{z^2 - 2\cos(\omega_0)z + 1}{z^2}$$

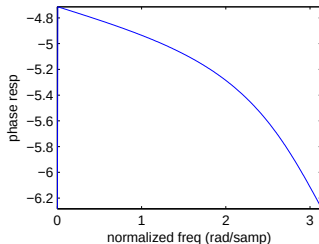
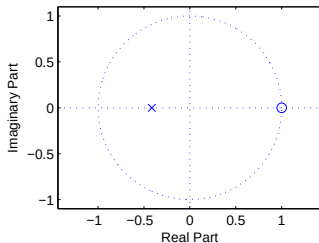
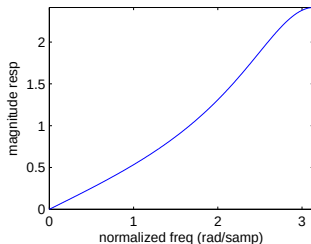
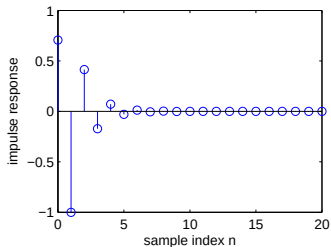


Simple Filtering IV: Lowpass IIR

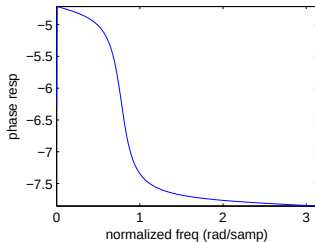
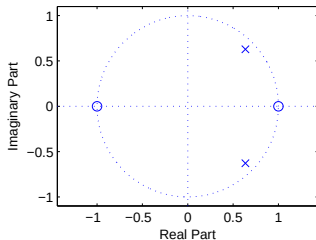
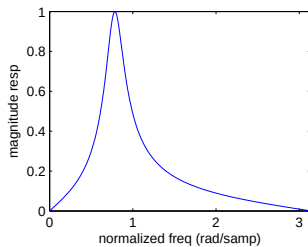
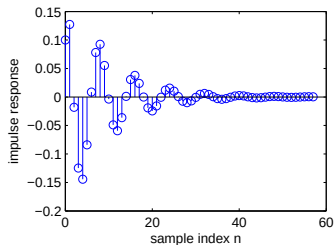
$$H(z) = \frac{K(1+z^{-1})}{1-\alpha z^{-1}} = \frac{1-\alpha}{2} \frac{1+z^{-1}}{1-\alpha z^{-1}}$$



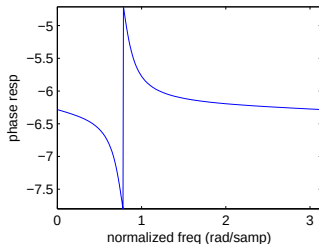
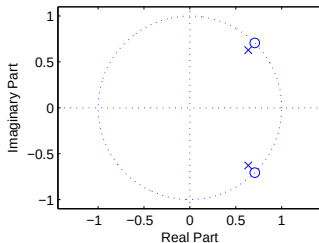
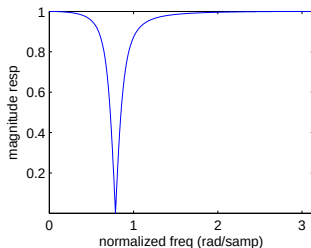
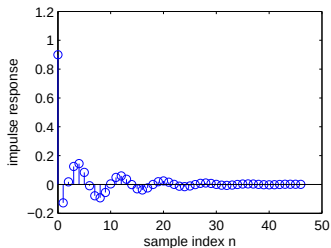
Simple Filtering V: Highpass IIR



Simple Filtering V: Bandpass IIR



Simple Filtering VI: Bandstop/Notch IIR



Simple Filtering VII: IIR Comb Filter

