

ECE615 Mixed-Signal IC Design

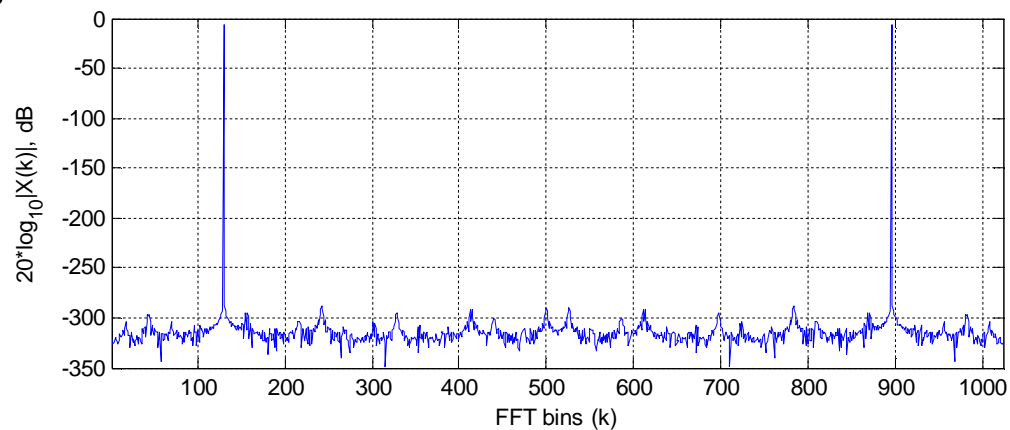
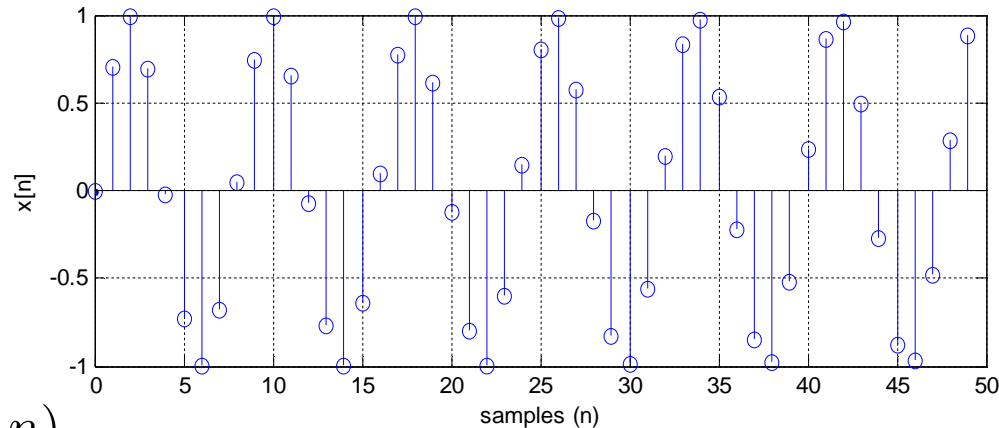
Lecture 3 Slides: Spectral Estimation

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Coherent Sampling

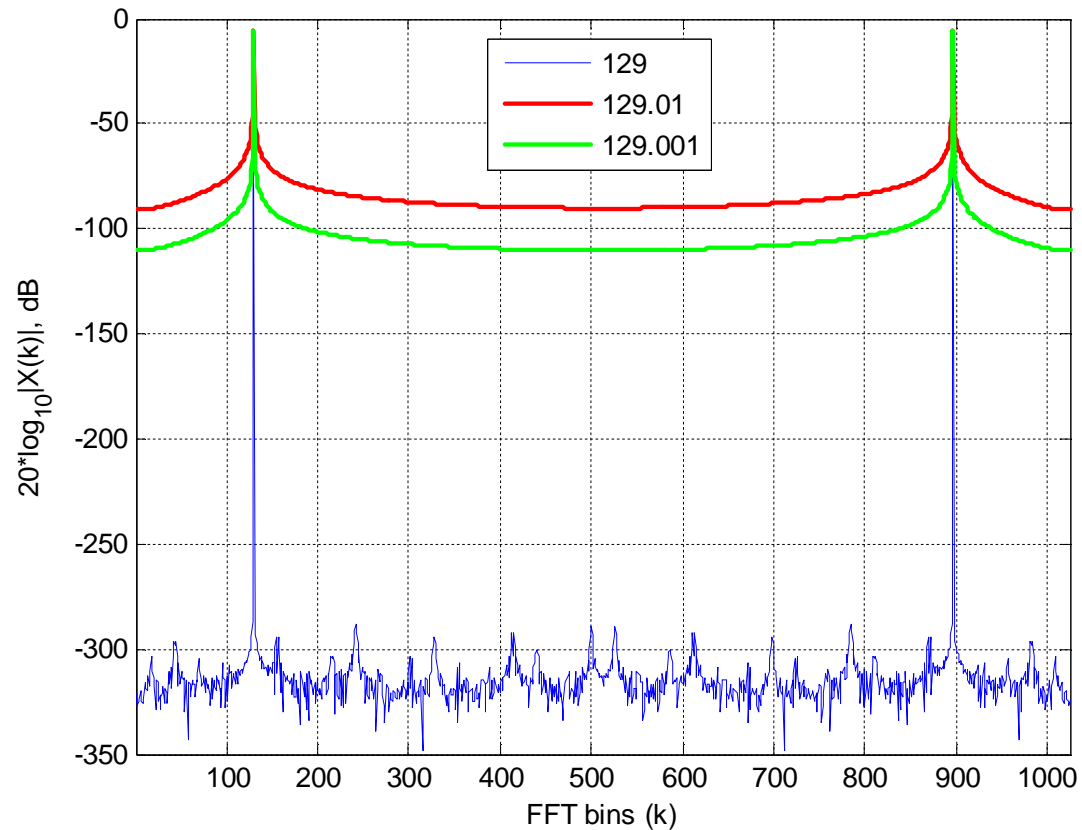
$$x[n] = \sin\left(2\pi \frac{f_{in}}{f_s} n\right)$$



$$\frac{f_{in}}{f_s} = \frac{129}{1024}$$

file:FFTdemo1.m

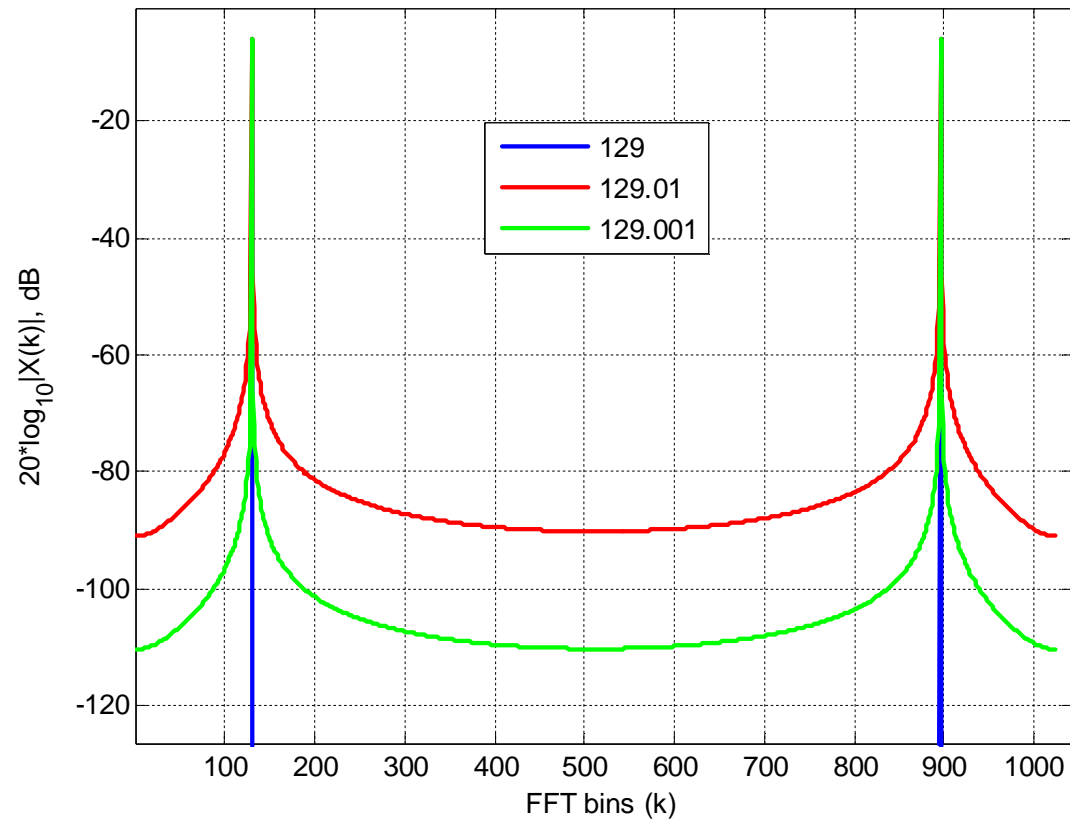
Non-Coherent Sampling : FFT leakage



$$\frac{f_{in}}{f_s} = \frac{129}{1024}, \frac{129.01}{1024}, \frac{129.001}{1024}$$

file:FFTdemo2.m

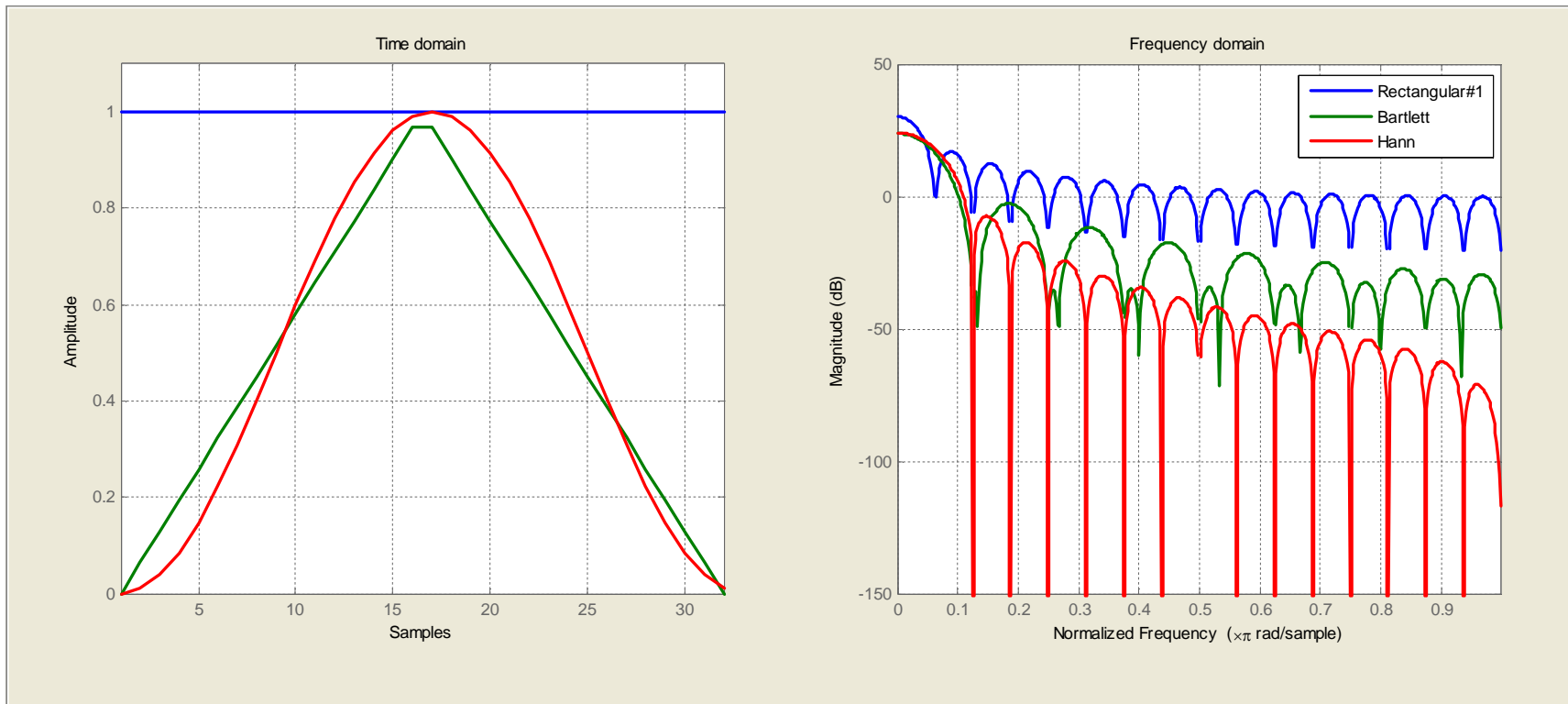
FFT leakage contd.



file:FFTdemo2.m

$$\frac{f_{in}}{f_s} = \frac{129}{1024}, \frac{129.01}{1024}, \frac{129.001}{1024}$$

Spectral Windows

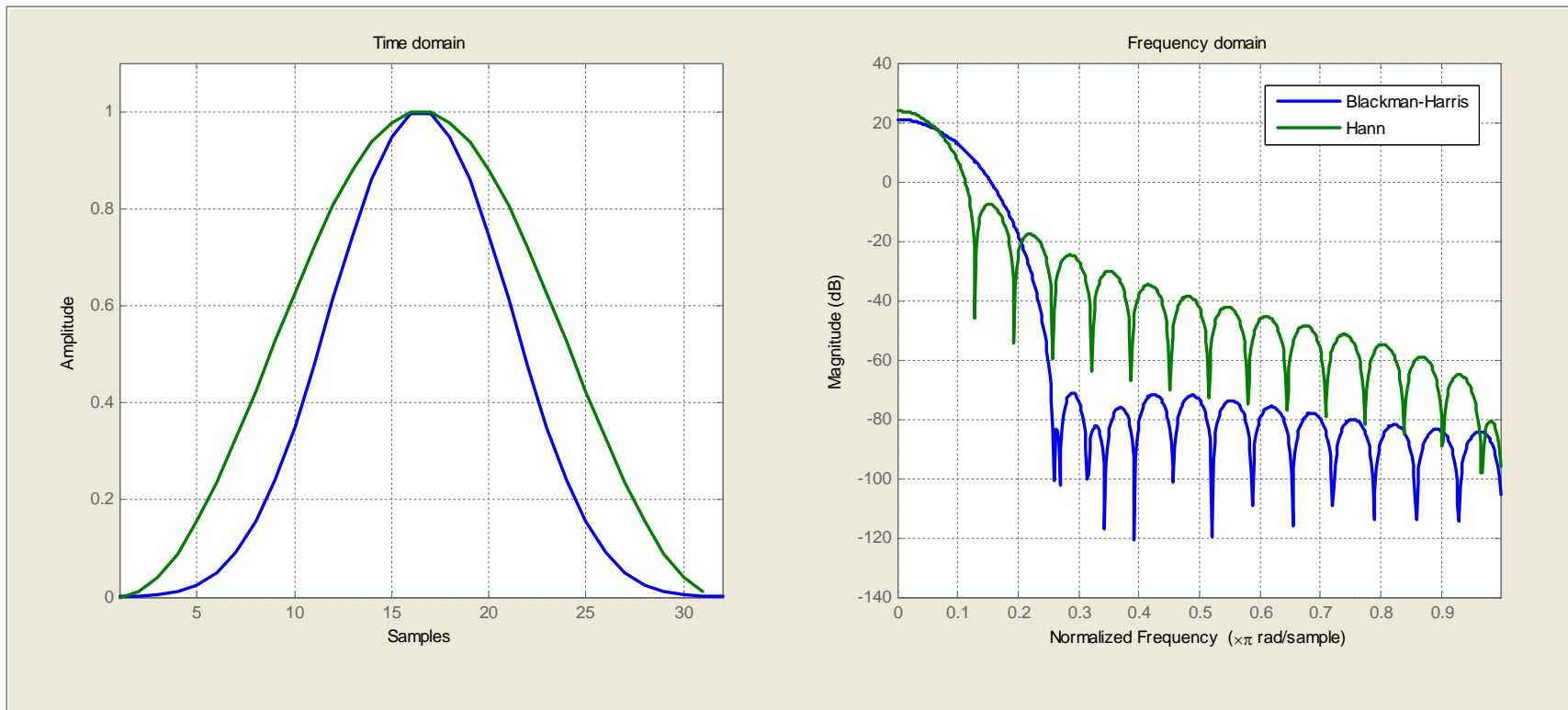


% Compare Rect, Bartlett and Hann windows

L = 32;

wvtool(rectwin(L), bartlett(L), ds_hann(L));

Spectral Windows contd.

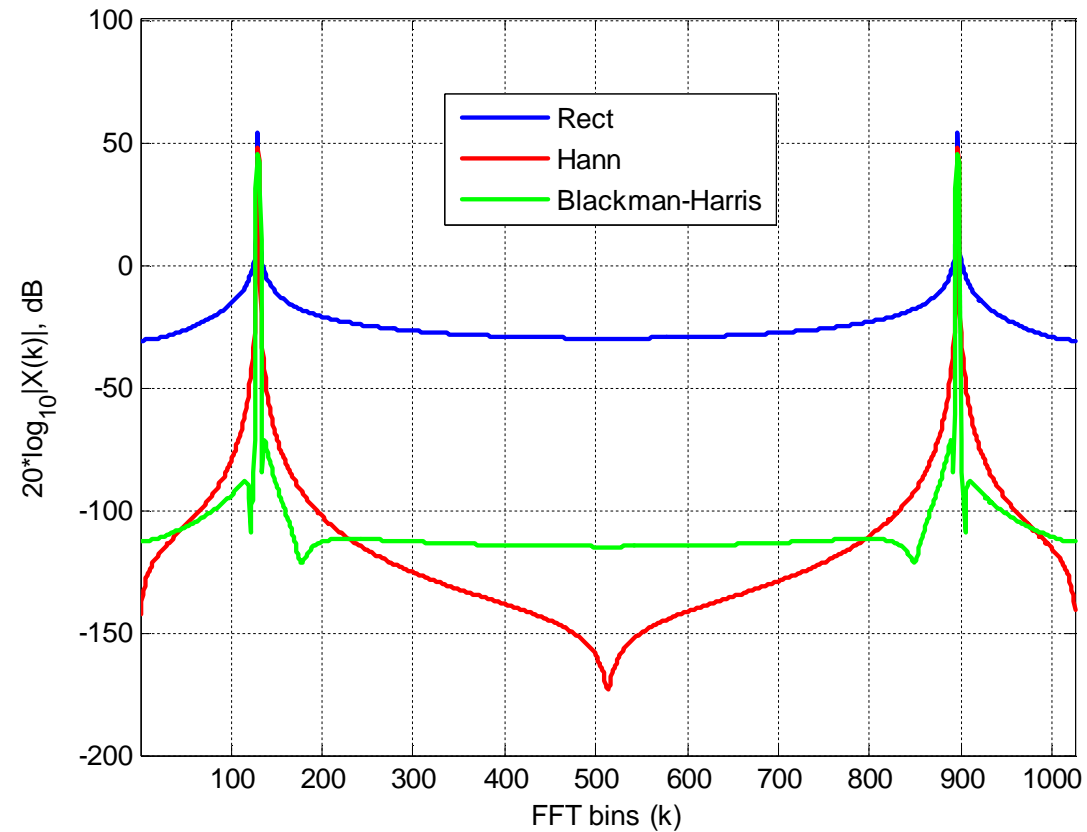


% Compare Blackman-Harris and Hann windows

L = 32;

wvtool(blackmanharris(L), ds_hann(L));

FFT with Windowing



file:FFTdemo_windowing.m

$$\frac{f_{in}}{f_s} = \frac{129.01}{1024}$$