

# Anti-Image Postfilter (6B)

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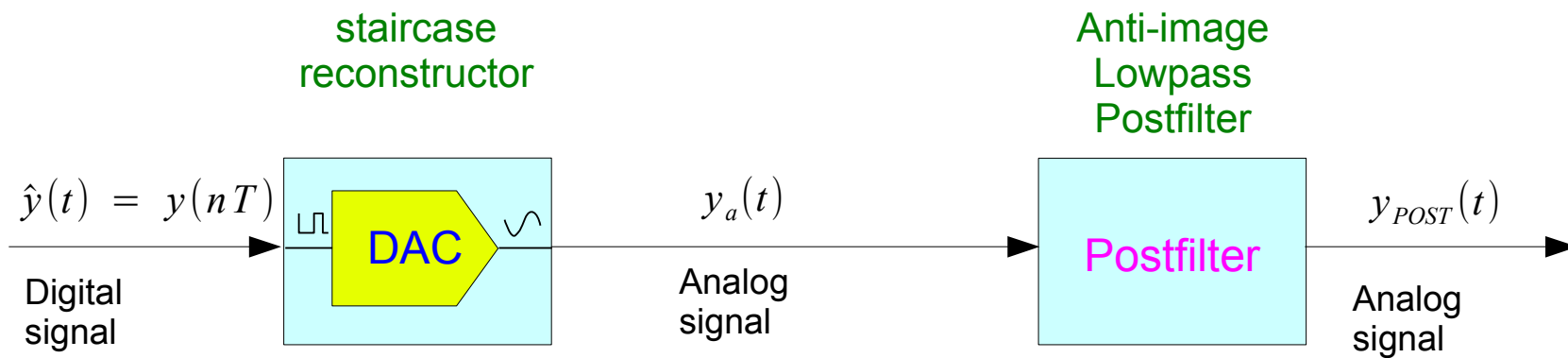
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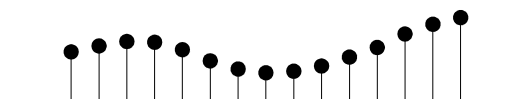
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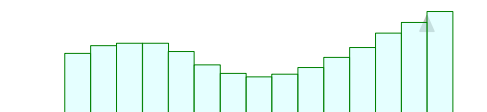
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$$\hat{y}(t) = y(nT)$$

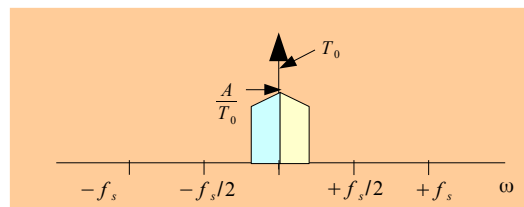
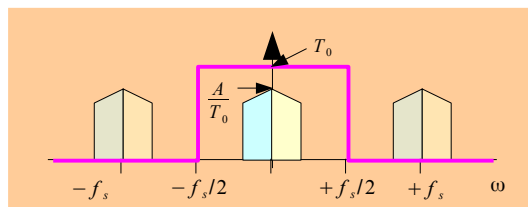
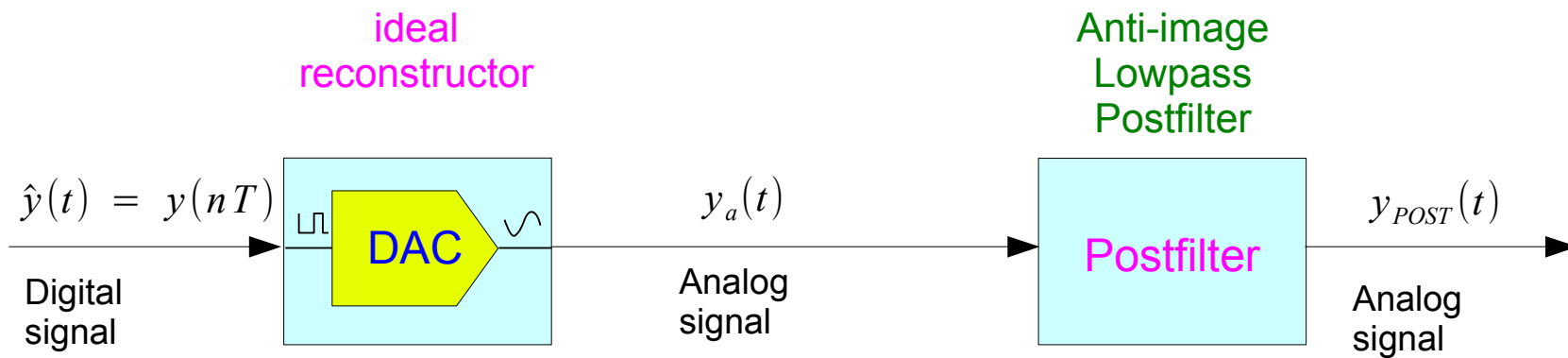


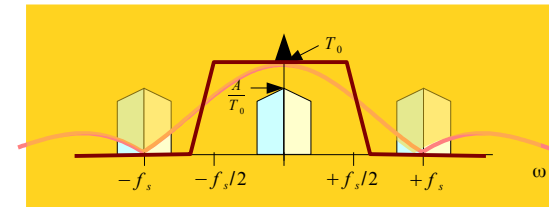
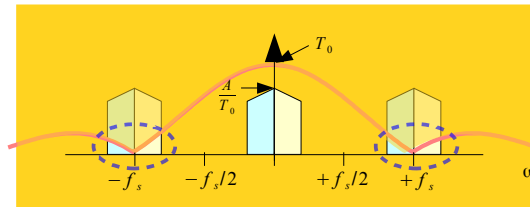
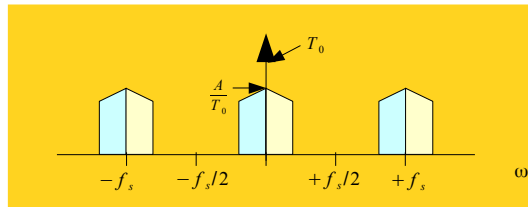
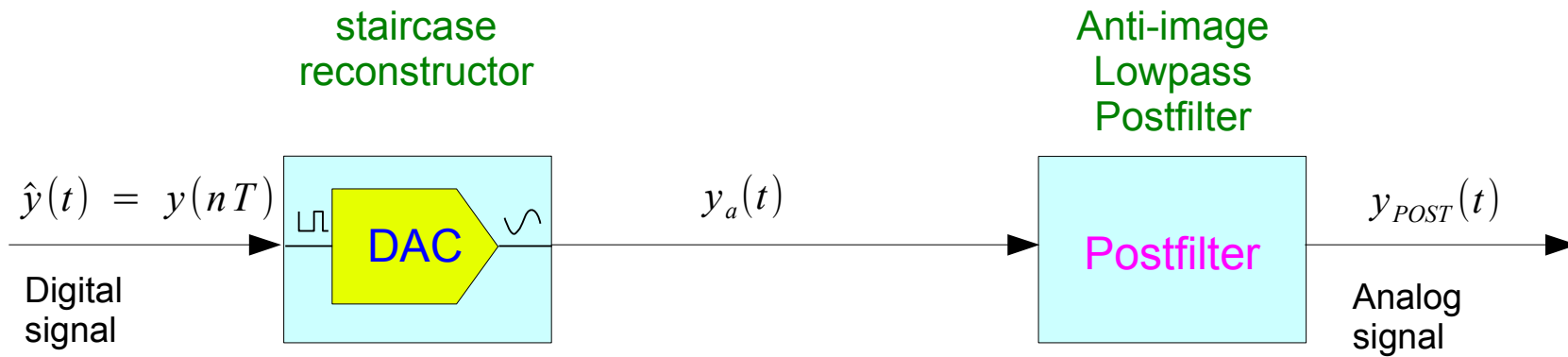
$$y_a(t)$$



$$y_{POST}(t)$$





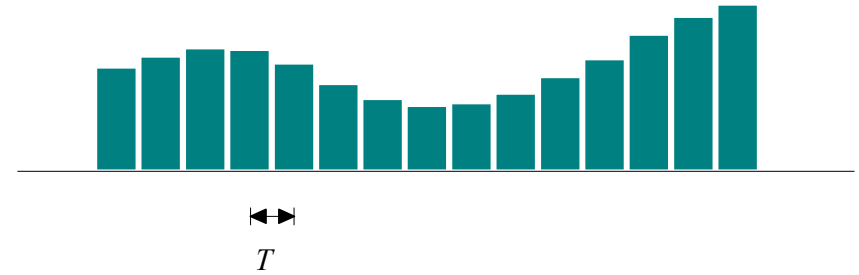
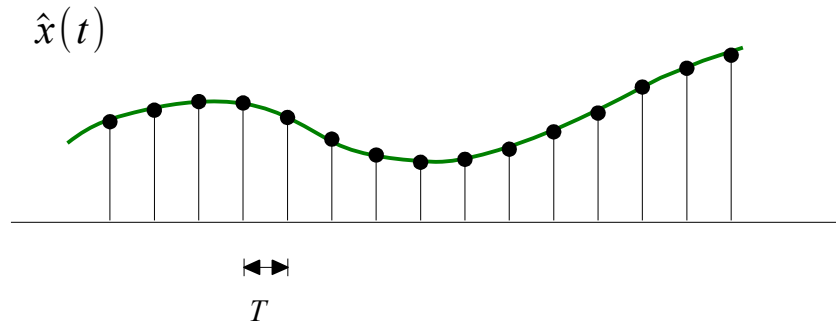


↑ surviving replica

↑ Non-flat: Partially attenuated

↑ surviving replica

# Analog Reconstructor



$$\hat{y}(t) = \sum_{n=-\infty}^{+\infty} y(nT) \delta(t-nT)$$

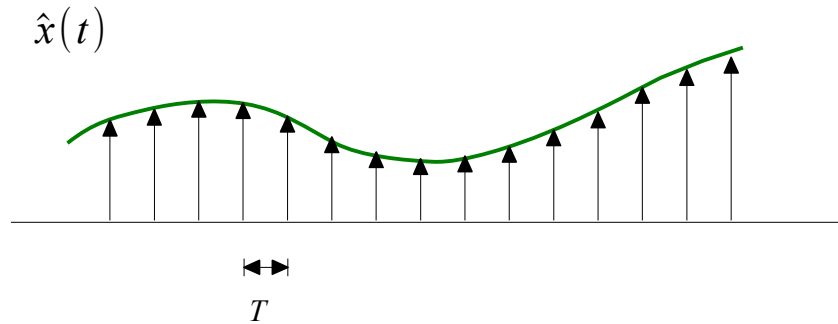
$$Y_a(f) = H(f) \hat{Y}(f)$$

$$y_a(t) = \int_{-\infty}^{+\infty} h(t-t') \hat{y}(t') dt'$$

$$\hat{Y}_a(f) = \frac{1}{T} \sum_{m=-\infty}^{+\infty} Y(f - m f_s)$$

$$y_a(t) = \sum_{n=-\infty}^{+\infty} y(nT) h(t-nT)$$

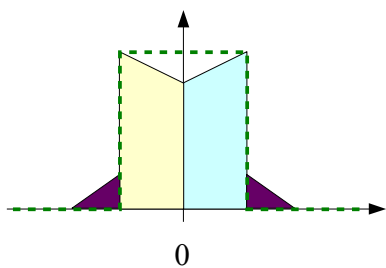
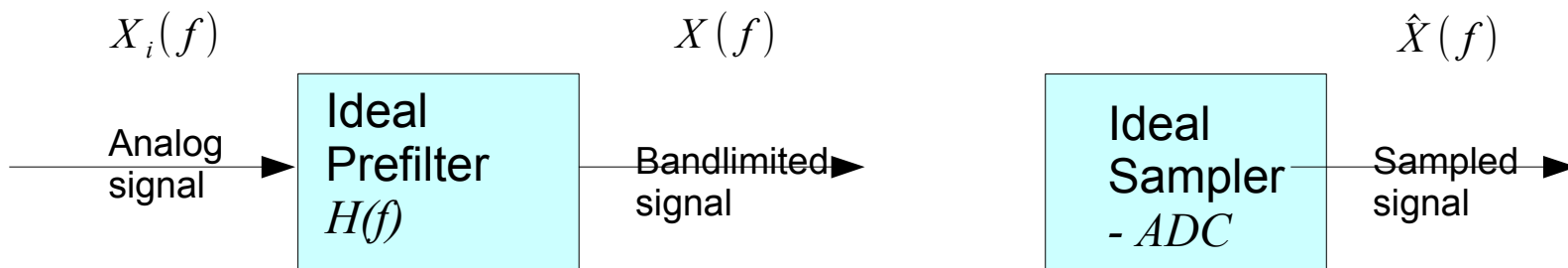
# Impulse Response of Ideal Reconstructor



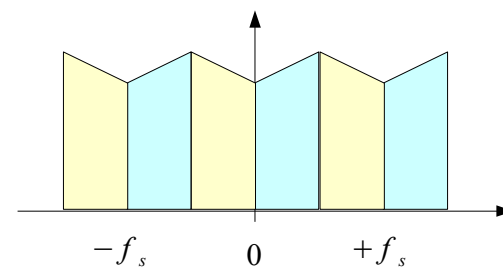
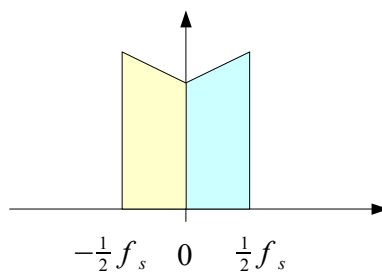
$$\hat{Y}(f) = \frac{1}{T} Y(f) \quad -\frac{f_s}{2} \leq f \leq +\frac{f_s}{2}$$

$$y(t) = \sum_{n=-\infty}^{+\infty} y(nT) h(t-nT)$$

$$h(t) = \frac{\sin(\pi t/T)}{\pi t/T} = \frac{\sin(\pi f_s t)}{\pi f_s t}$$



$$\frac{2}{4}f_s \quad \frac{3}{4}f_s \quad f_s$$









## References

- [1] <http://en.wikipedia.org/>
- [2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003
- [3] A "graphical interpretation" of the DFT and FFT, by Steve Mann
- [4] R. G. Lyons, Understanding Digital Signal Processing, 1997
- [5] AVR121: Enhancing ADC resolution by oversampling
- [6] S.J. Orfanidis, Introduction to Signal Processing  
[www.ece.rutgers.edu/~orfanidi/intro2sp](http://www.ece.rutgers.edu/~orfanidi/intro2sp)