

Anti-aliasing Prefilter (6B)

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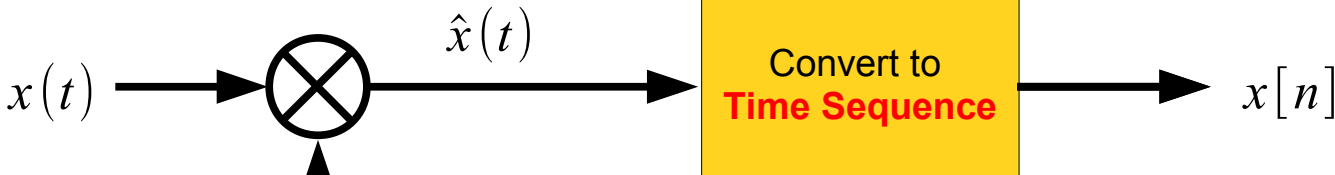
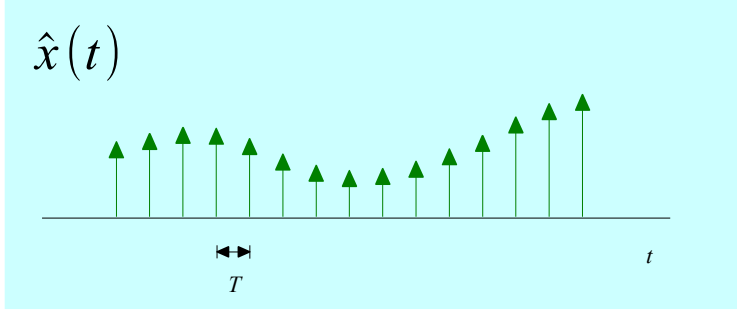
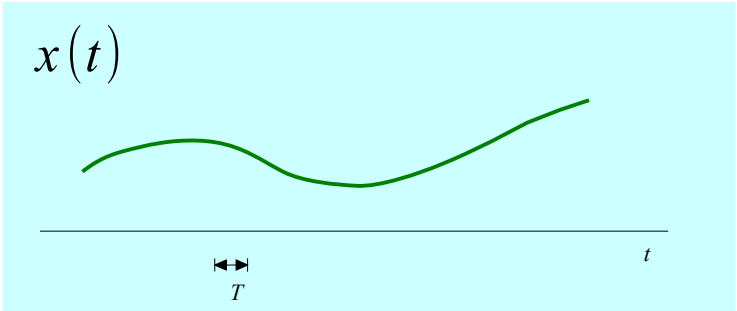
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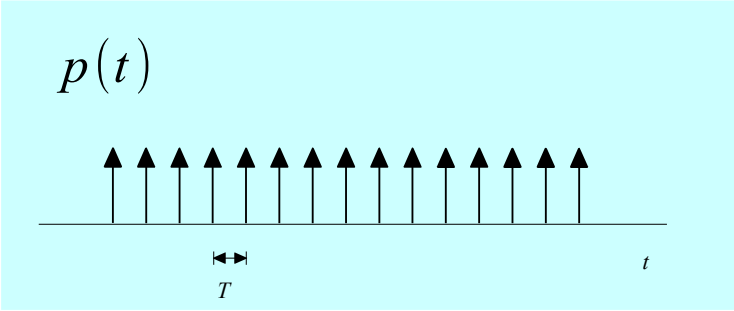
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Time Sequence

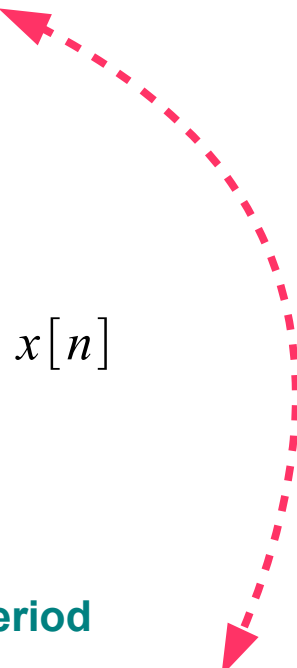
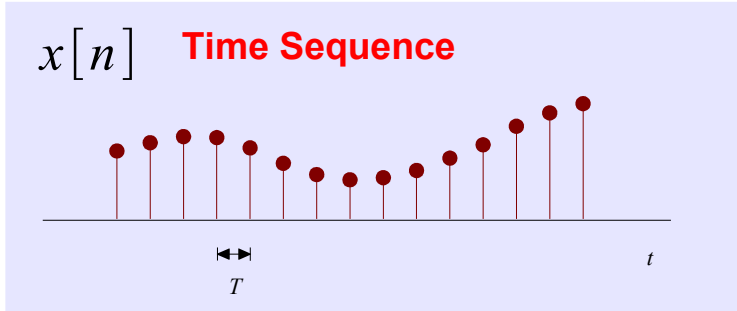


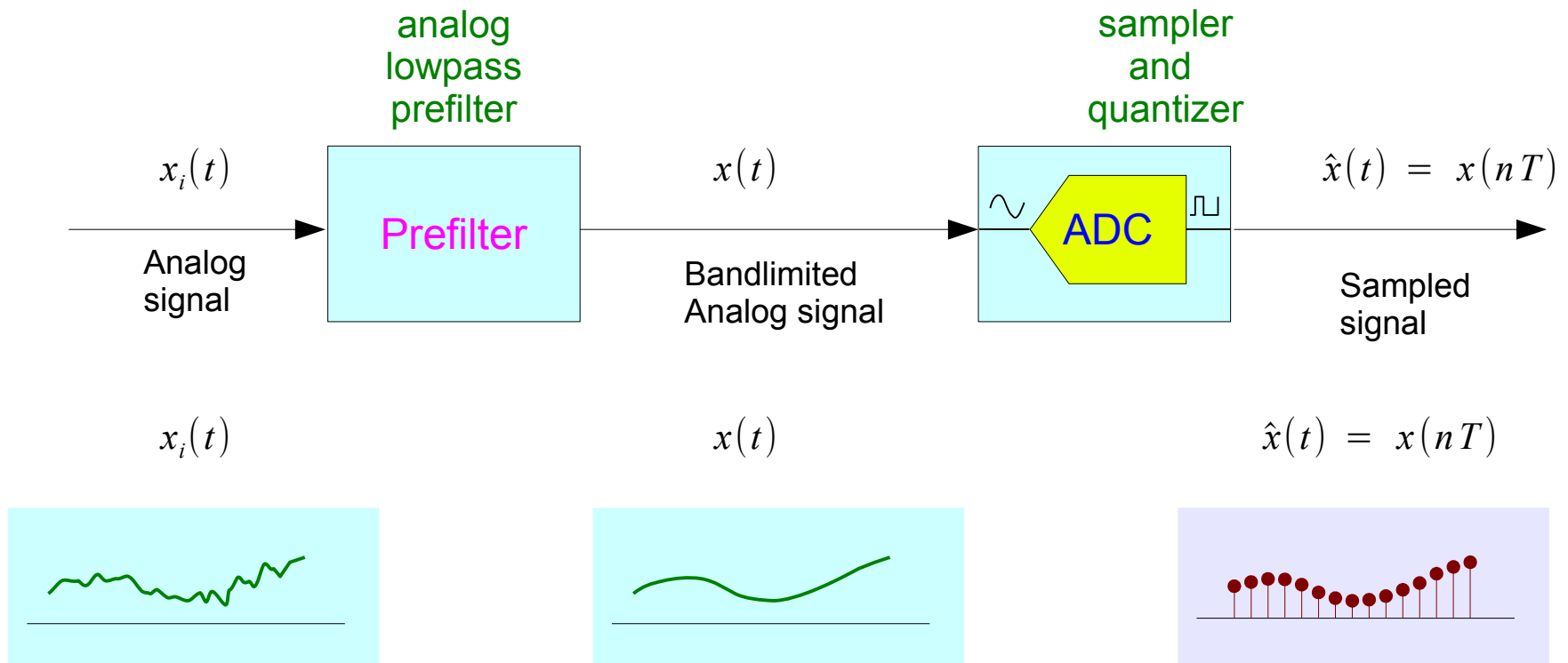
Ideal Sampling

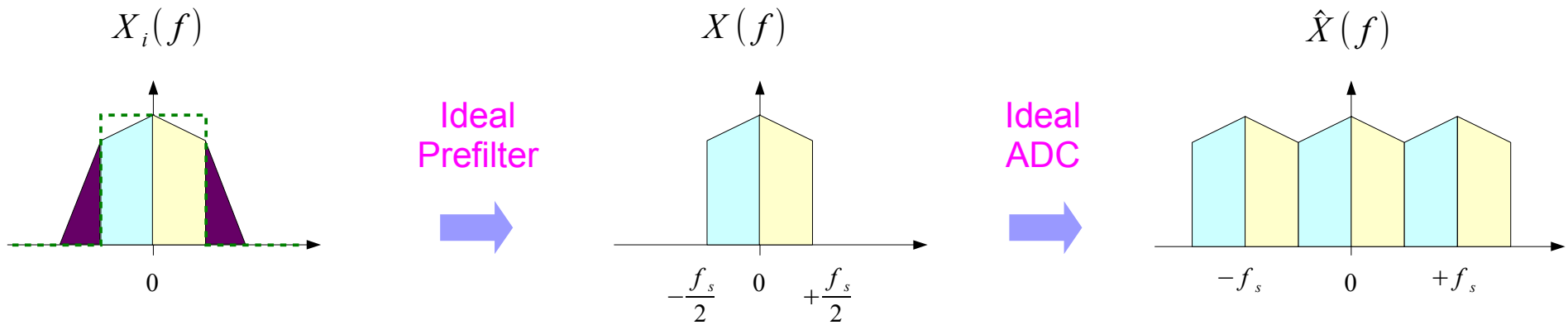
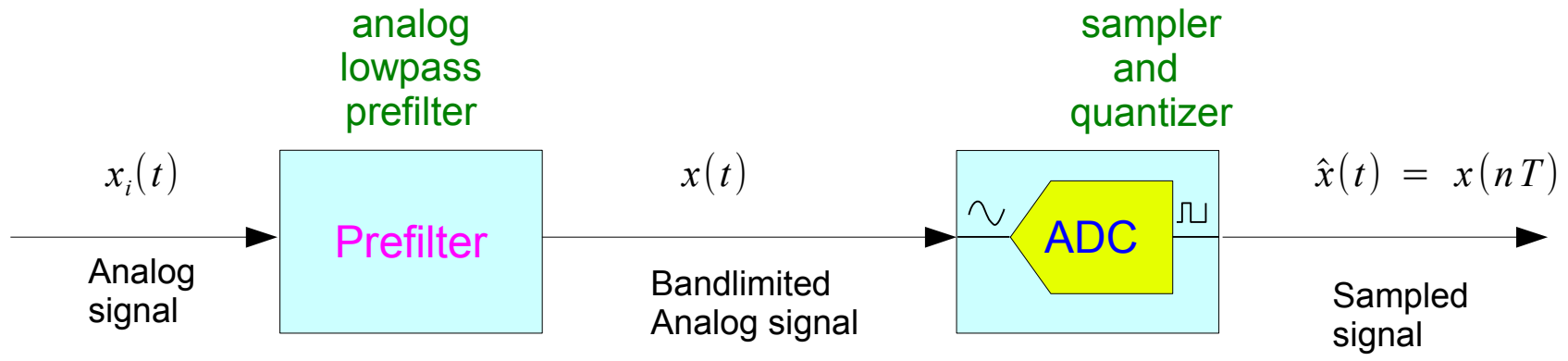
$$p(t) = \sum_{n=-\infty}^{+\infty} \delta(t - nT)$$

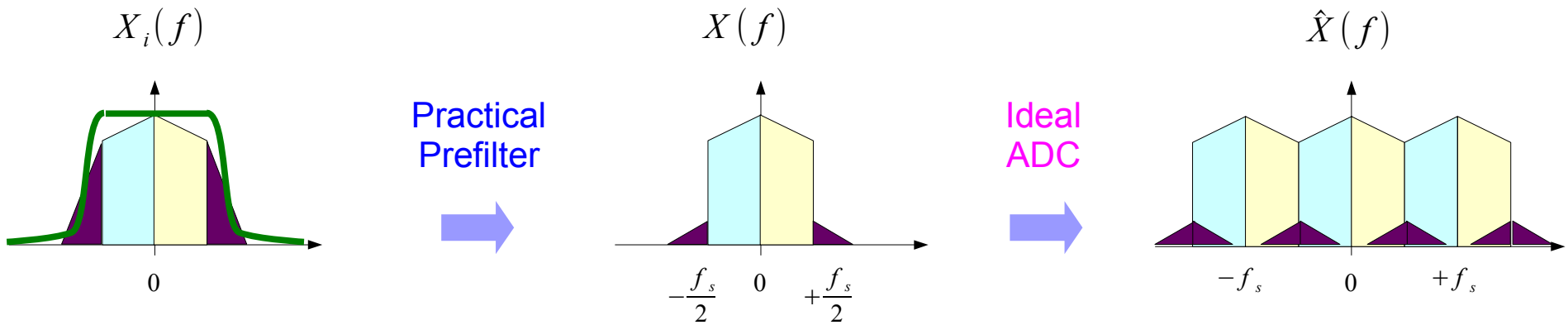
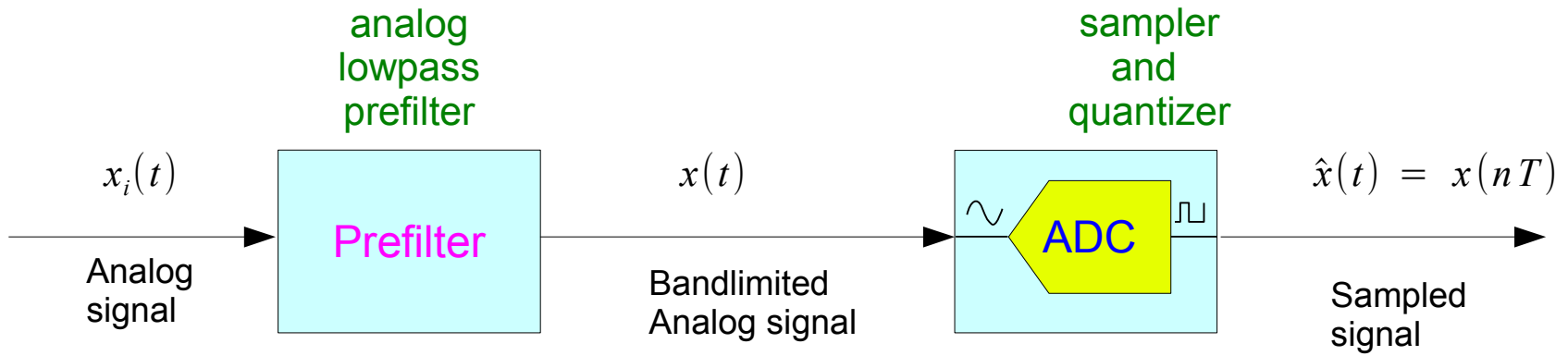


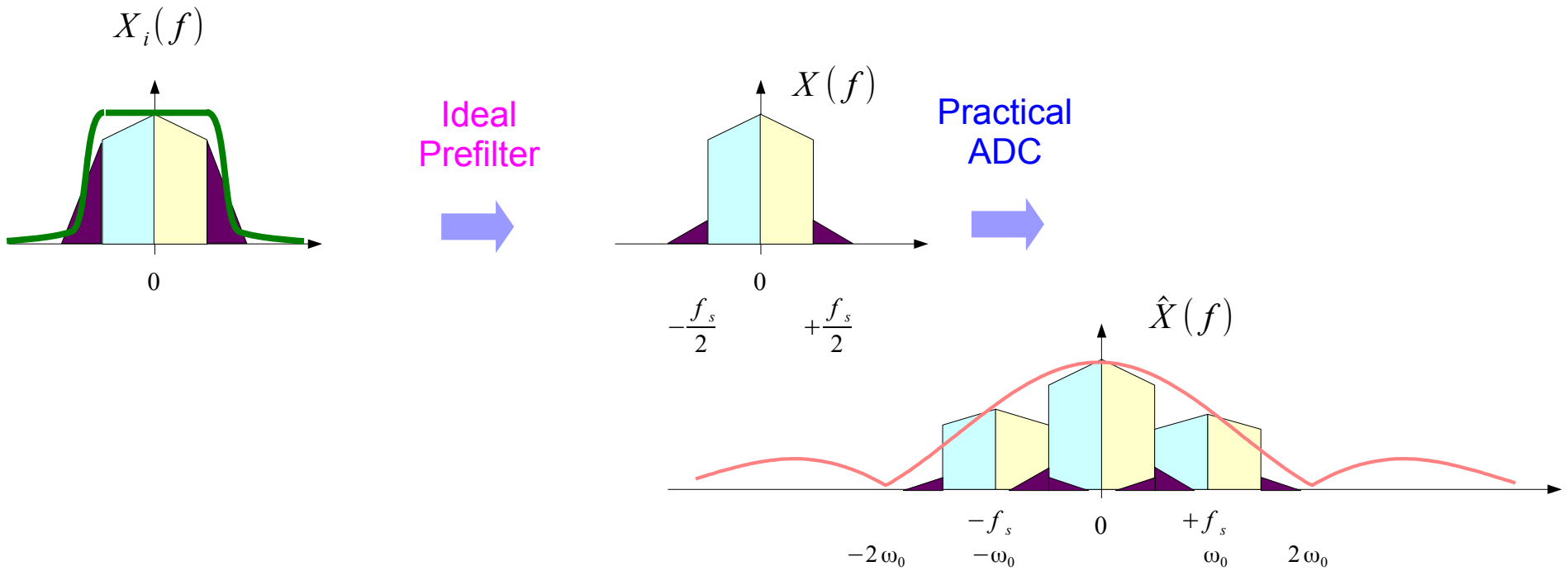
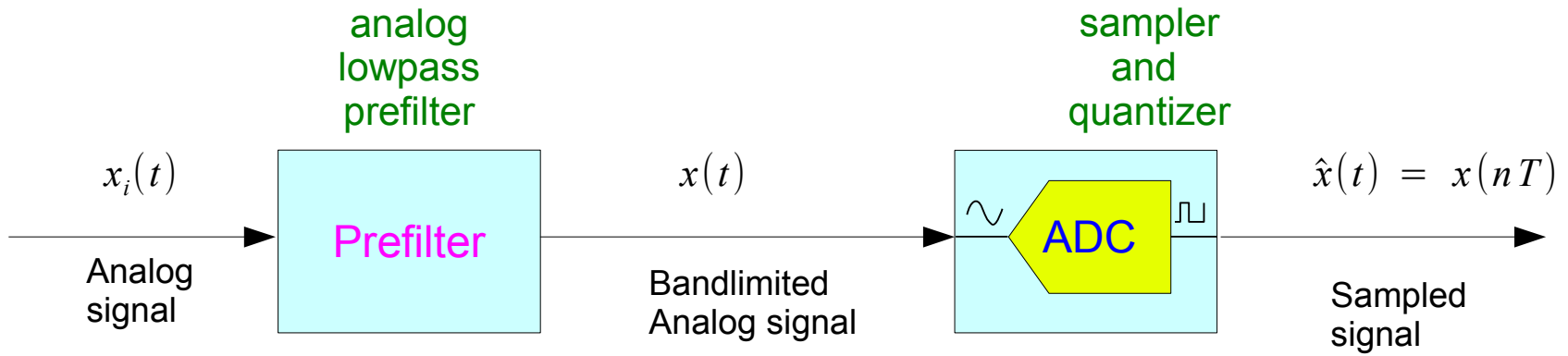
T Sampling Period





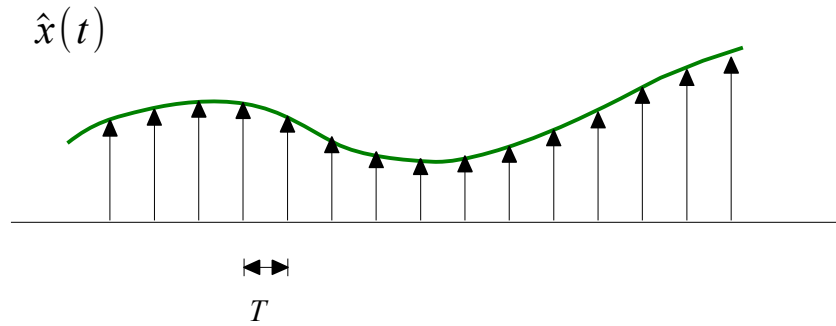






Sampler

Ideal Sampling

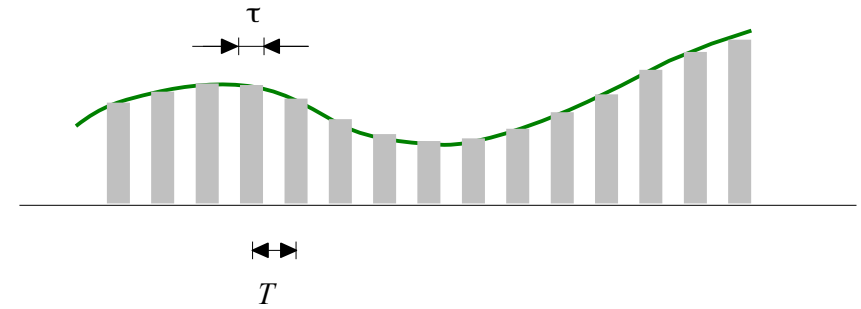


$$\hat{x}(t) = \sum_{n=-\infty}^{+\infty} x(nT) \delta(t-nT)$$

↓ CTFT

$$\hat{X}(f) = \int_{-\infty}^{+\infty} \hat{x}(t) e^{-j2\pi ft} dt$$

Practical Sampling

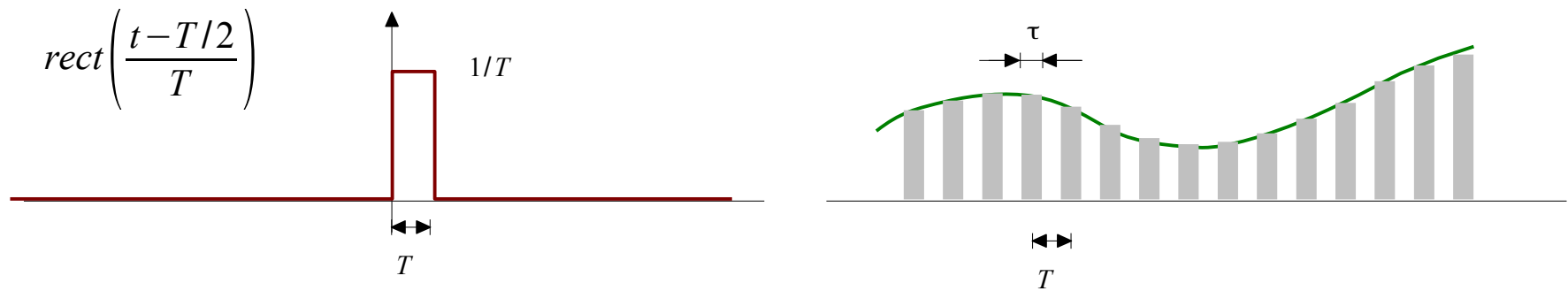


$$\hat{x}(t) \approx \sum_{n=-\infty}^{+\infty} x(nT) p(t-nT)$$

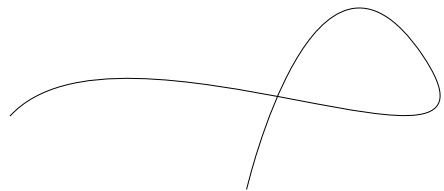
↓ CTFT

$$?$$

Zero Order Hold (ZOH)

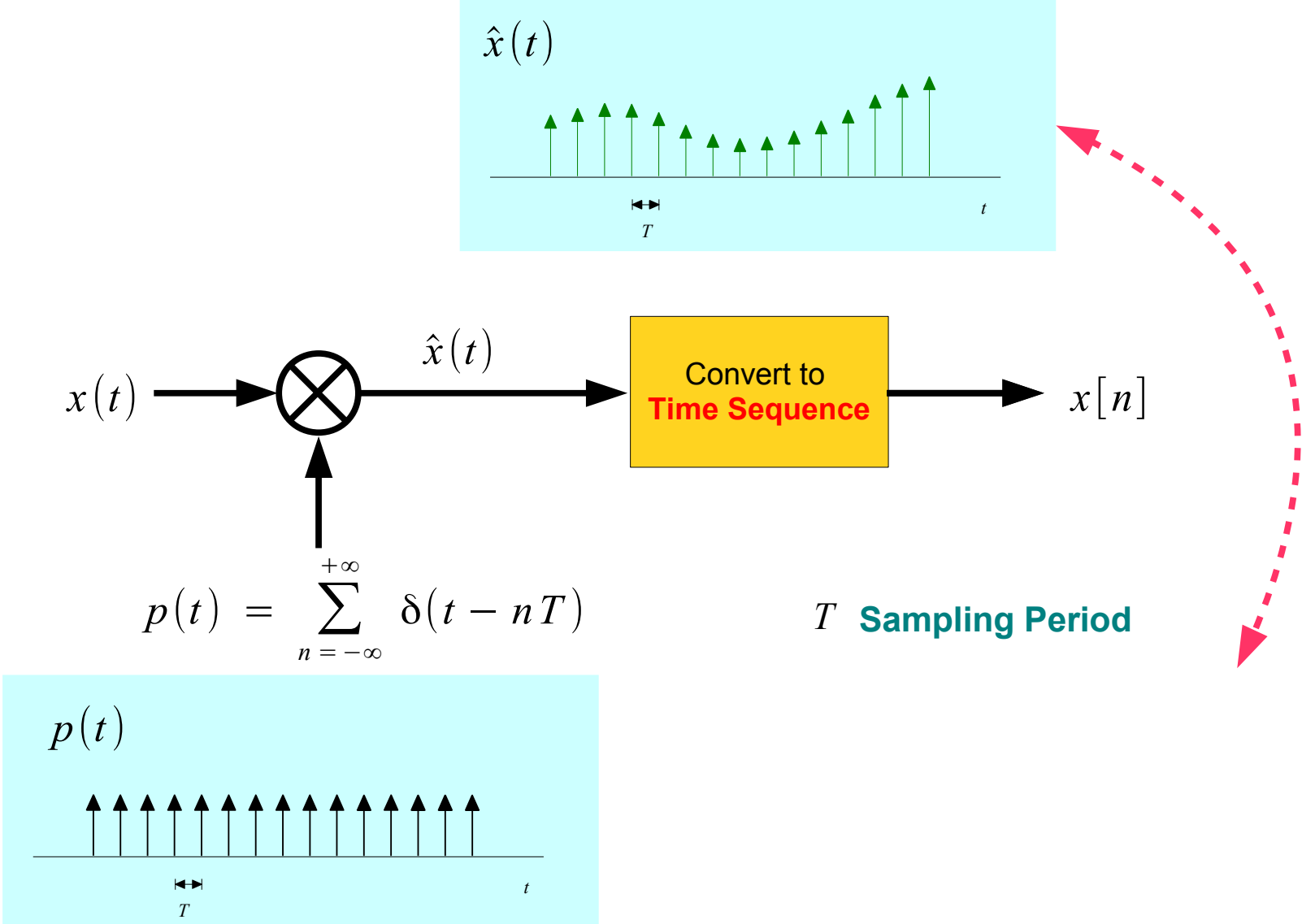


$$x_{ZOH}(t) = \sum_{n=-\infty}^{+\infty} x[n] \cdot \text{rect}\left(\frac{t - T/2 - nT}{T}\right)$$



Time Sequence

Ideal Sampling



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