

# CT Rectangle Function (3B)

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- Continuous Time Rectangle Function

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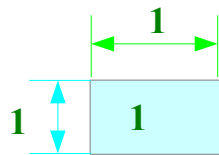
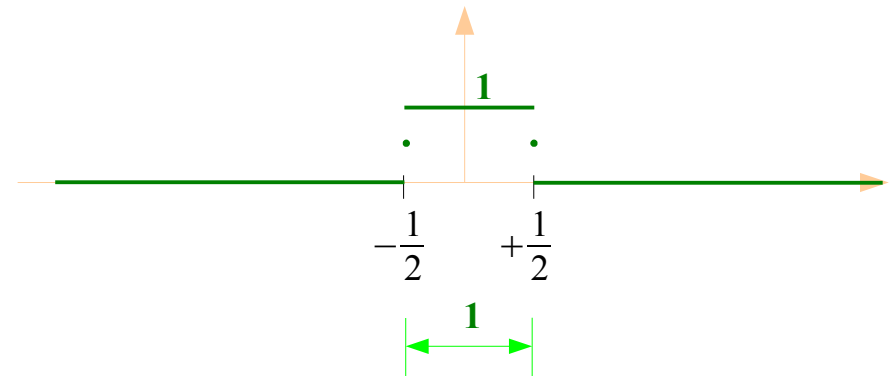
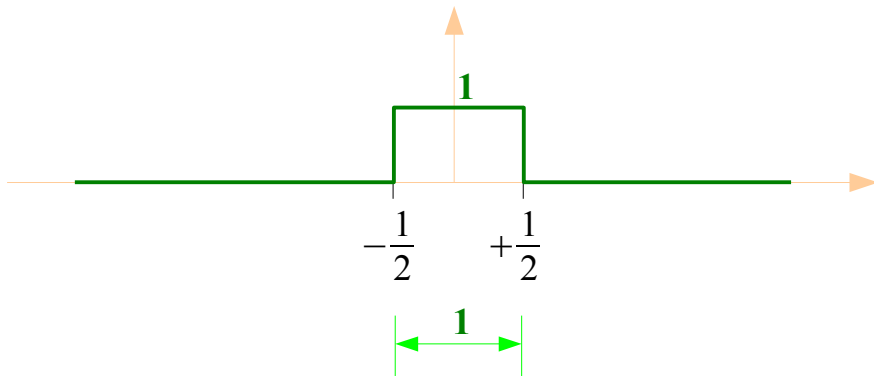
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# Rectangular Pulse (1)

$$\mathit{rect}(t) = \begin{cases} 1 & (|t| < \frac{1}{2}) \\ 0 & (|t| > \frac{1}{2}) \end{cases}$$

$$\mathit{rect}(t) = \begin{cases} 1 & (|t| < \frac{1}{2}) \\ \frac{1}{2} & (|t| = \frac{1}{2}) \\ 0 & (|t| > \frac{1}{2}) \end{cases}$$

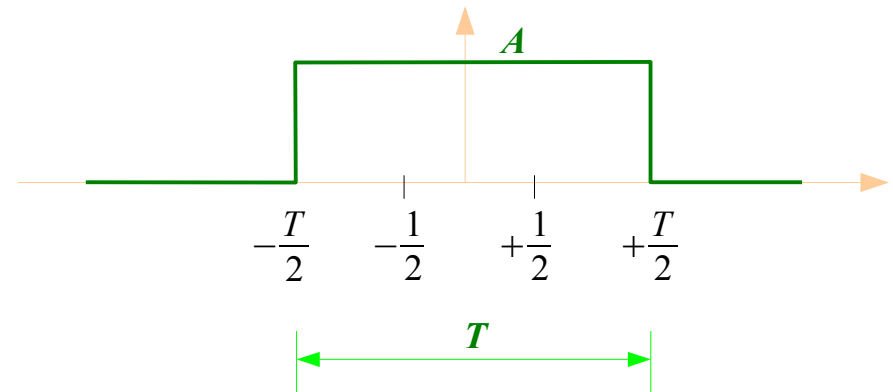
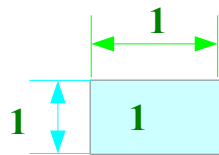
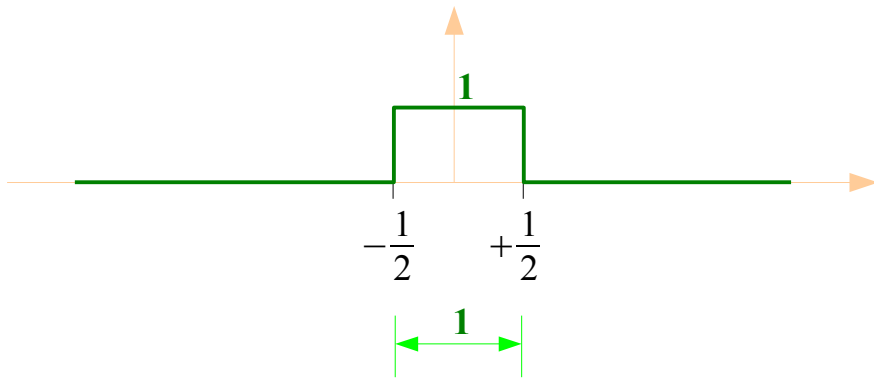


Unit Rectangle Function  
Rectangular Pulse Function

# Rectangular Pulse (2)

$$\text{rect}(t) = \begin{cases} 1 & (|t| < \frac{1}{2}) \\ 0 & (|t| > \frac{1}{2}) \end{cases}$$

$$A \cdot \text{rect}\left(\frac{t}{T}\right)$$



$$t = -\frac{T}{2}$$



$$\frac{t}{T} \rightarrow -\frac{1}{2}$$

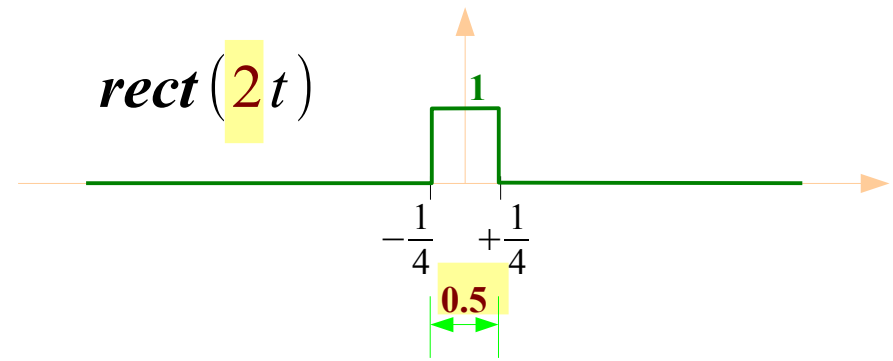
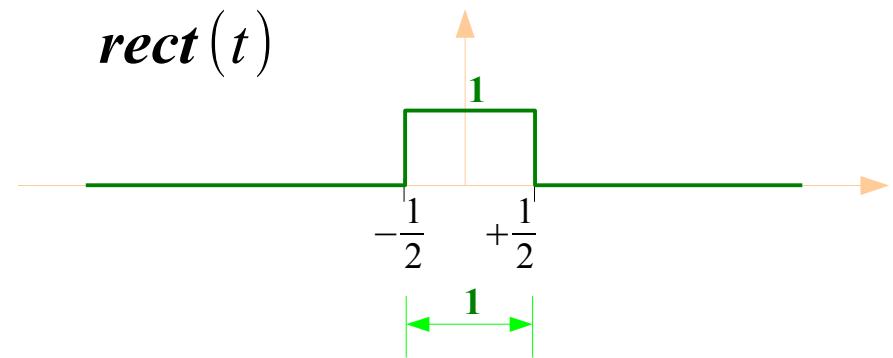
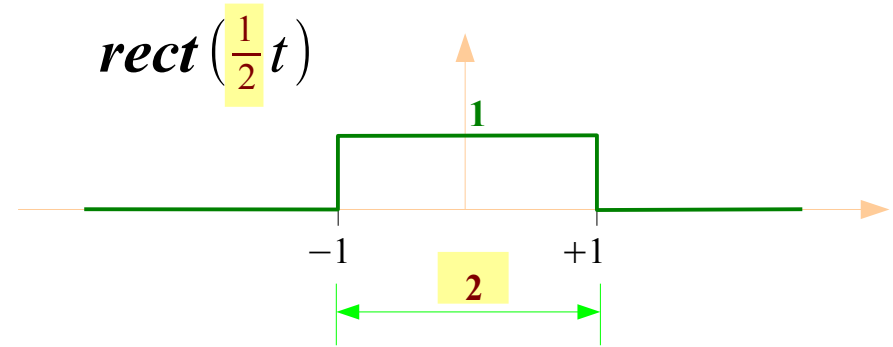
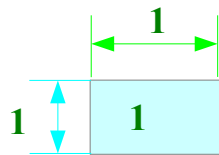
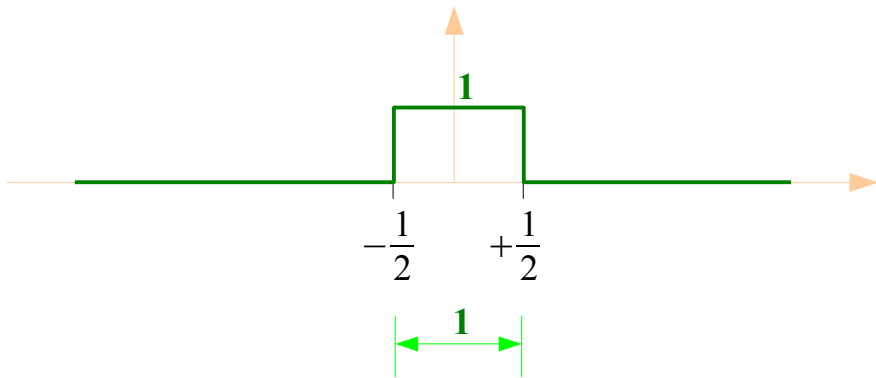
$$t = +\frac{T}{2}$$



$$\frac{t}{T} \rightarrow +\frac{1}{2}$$

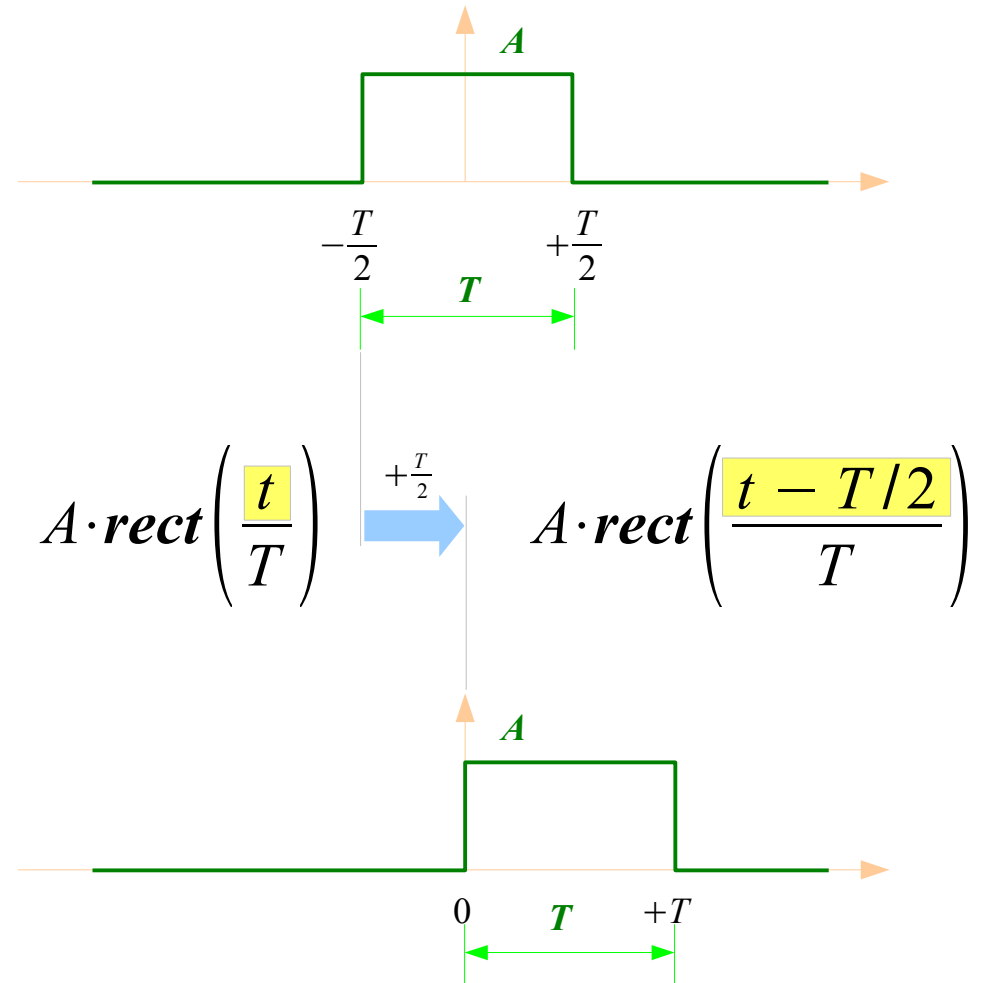
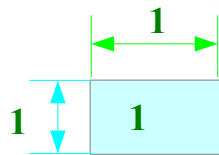
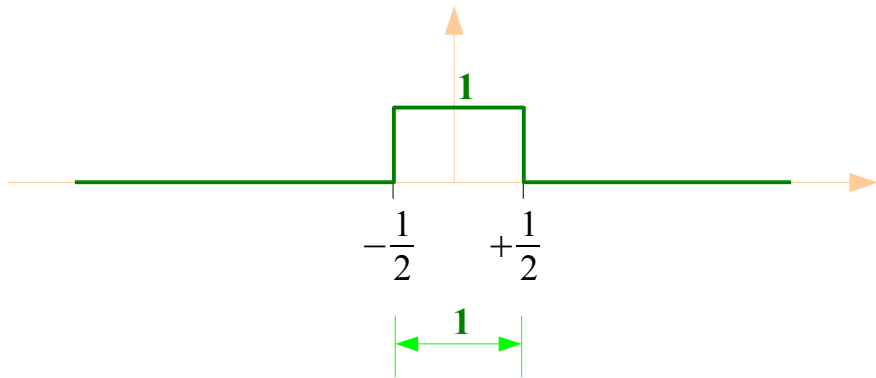
# Rectangular Pulse (3)

$$\text{rect}(t) = \begin{cases} 1 & (|t| < \frac{1}{2}) \\ 0 & (|t| > \frac{1}{2}) \end{cases}$$

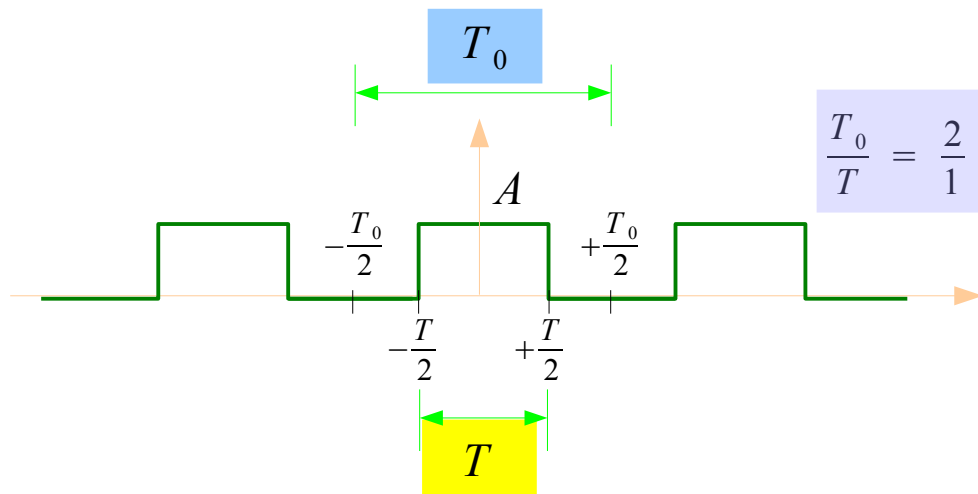
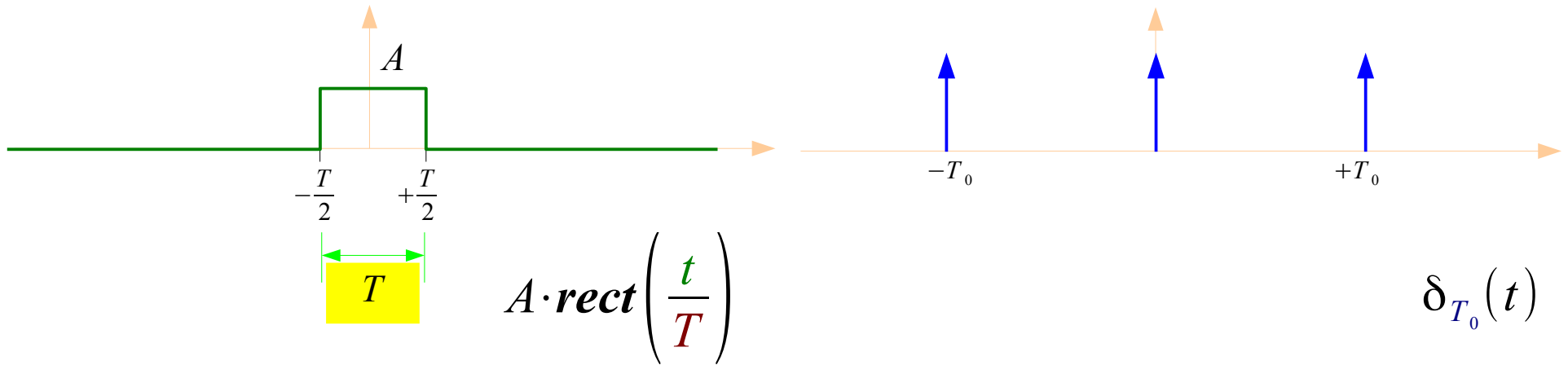


# Rectangular Pulse (4)

$$\text{rect}(t) = \begin{cases} 1 & (|t| < \frac{1}{2}) \\ 0 & (|t| > \frac{1}{2}) \end{cases}$$

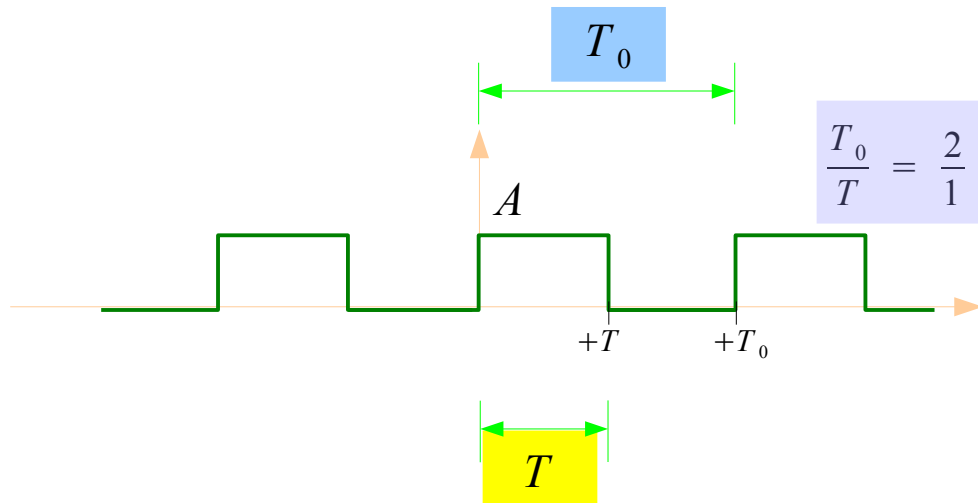
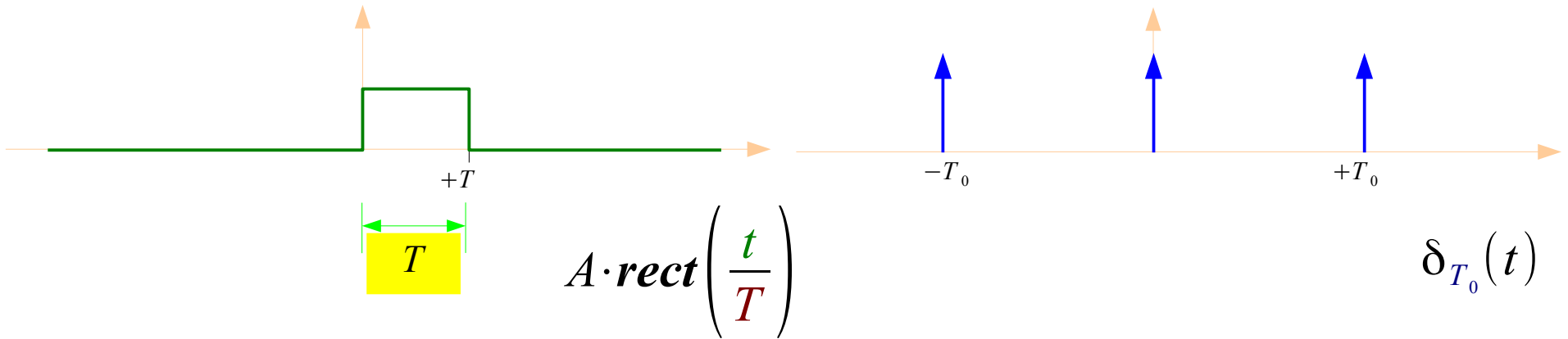


# Periodic Pulse Train (1)



$$A \cdot \text{rect}\left(\frac{t}{T}\right) * \delta_{T_0}(t)$$

# Periodic Pulse Train (2)



$$A \cdot \text{rect}\left(\frac{t}{T}\right) * \delta_{T_0}(t)$$



## References

- [1] <http://en.wikipedia.org/>
- [2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003
- [3] G. Beale, [http://teal.gmu.edu/~gbeale/ece\\_220/fourier\\_series\\_02.html](http://teal.gmu.edu/~gbeale/ece_220/fourier_series_02.html)
- [4] C. Langton, <http://www.complextoreal.com/chapters/fft1.pdf>
- [5] S. Haykin, An Introduction to Analog & Digital Communications, 1989