CT Rectangle Function (3B)

- Continuous Time Rectangle Function

Please send corrections (or suggestions) to youngwlim@hotmail.com.

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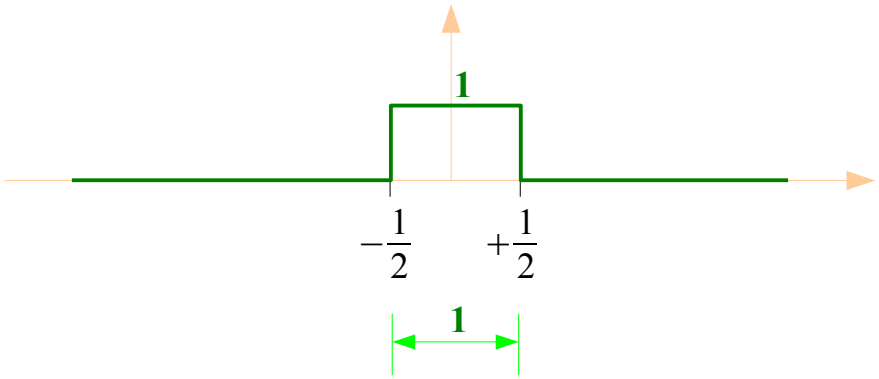
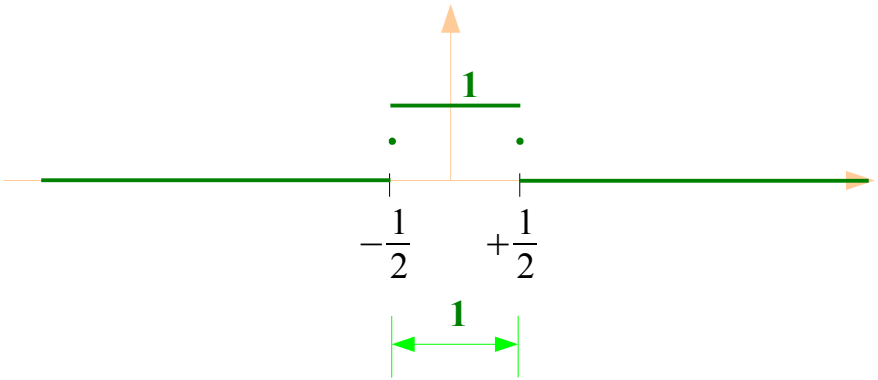
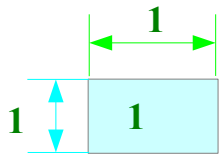
Rectangular Pulse (1)

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

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





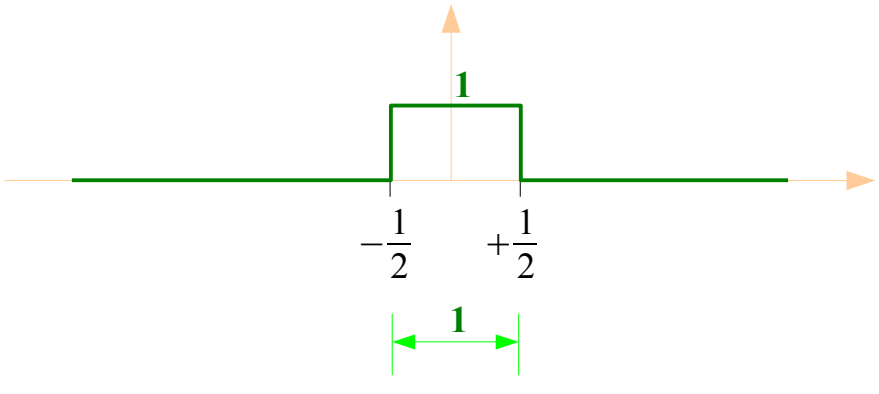


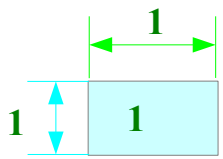
Unit Rectangle Function
Rectangular Pulse Function

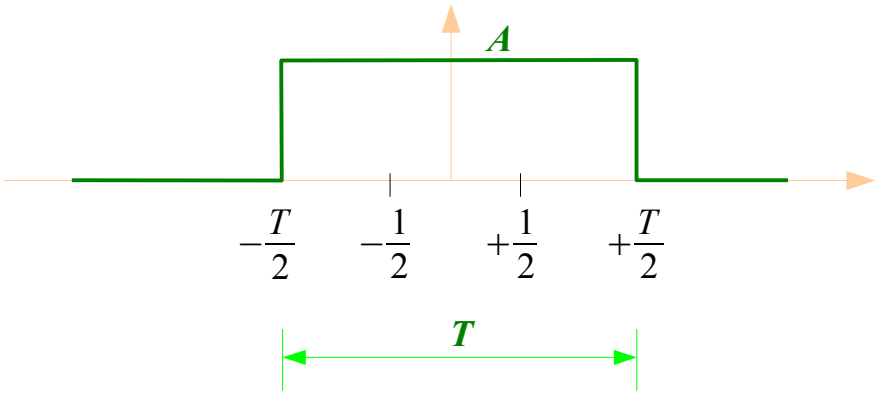
Rectangular Pulse (2)

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

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





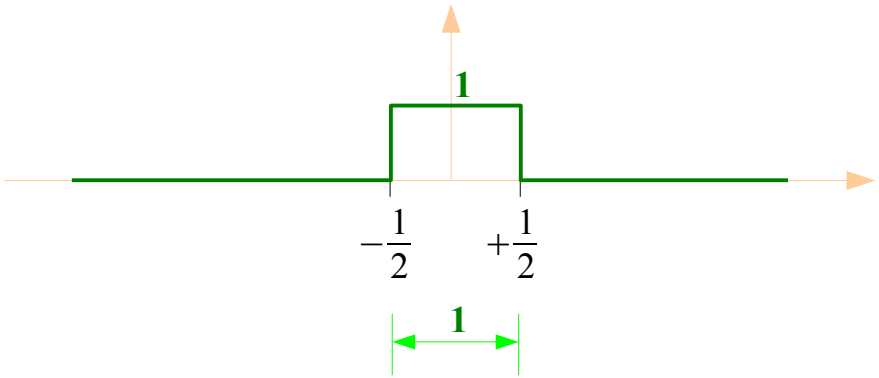


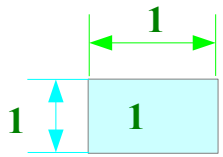
$$t = -\frac{T}{2} \qquad t = +\frac{T}{2}$$

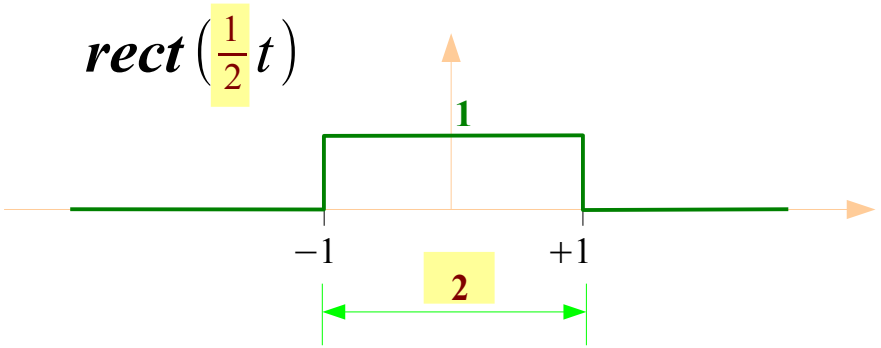
$$\frac{t}{T} \rightarrow -\frac{1}{2} \qquad \frac{t}{T} \rightarrow +\frac{1}{2}$$

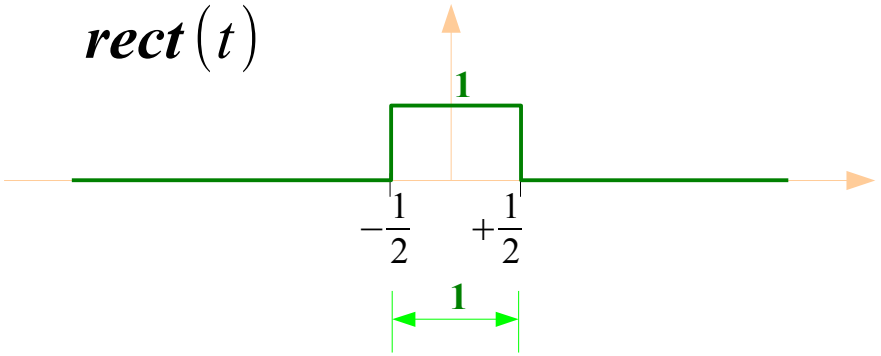
Rectangular Pulse (3)

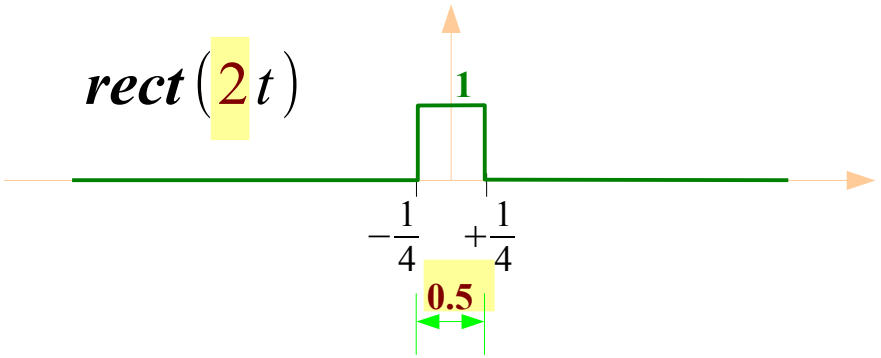
$$rect(t) = \begin{cases} 1 & (|t| < \frac{1}{2}) \\ 0 & (|t| > \frac{1}{2}) \end{cases}$$





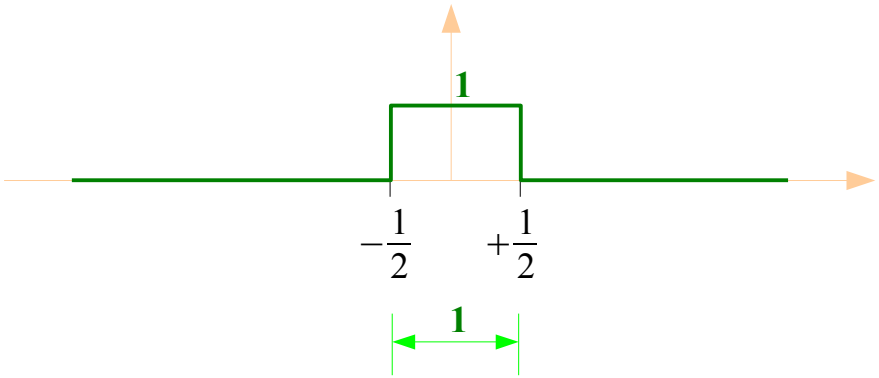


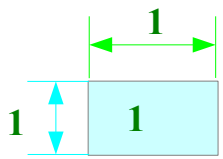


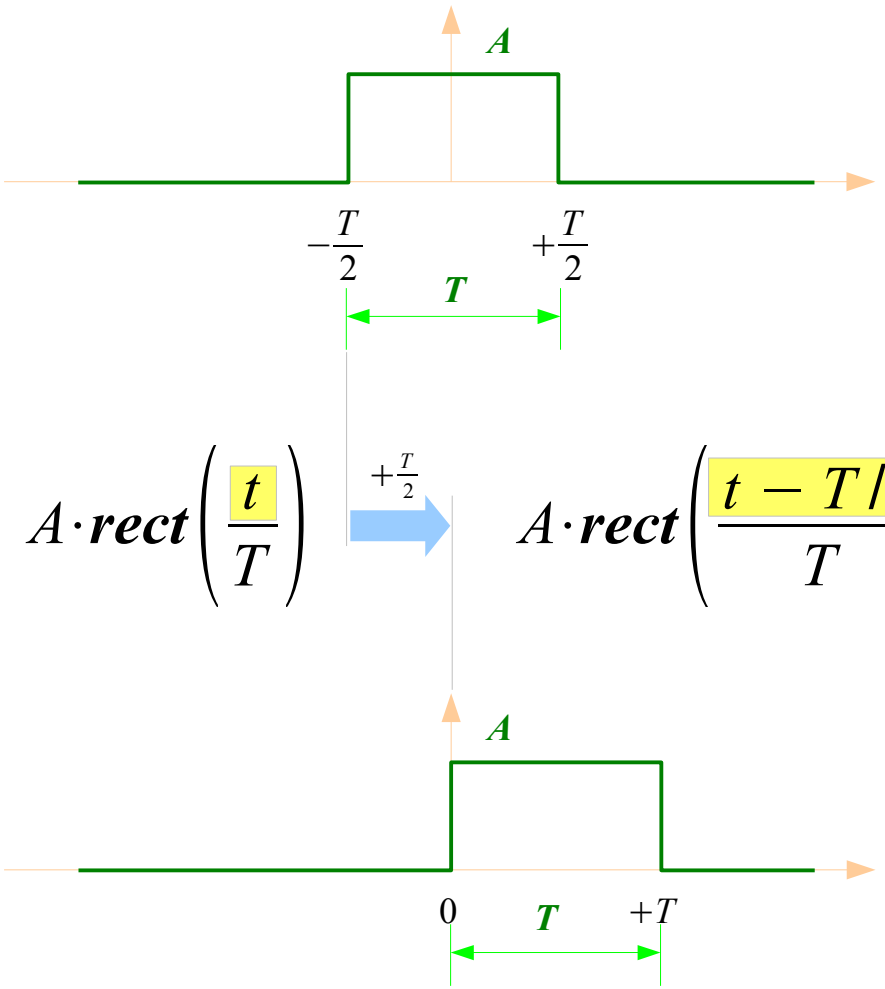


Rectangular Pulse (4)

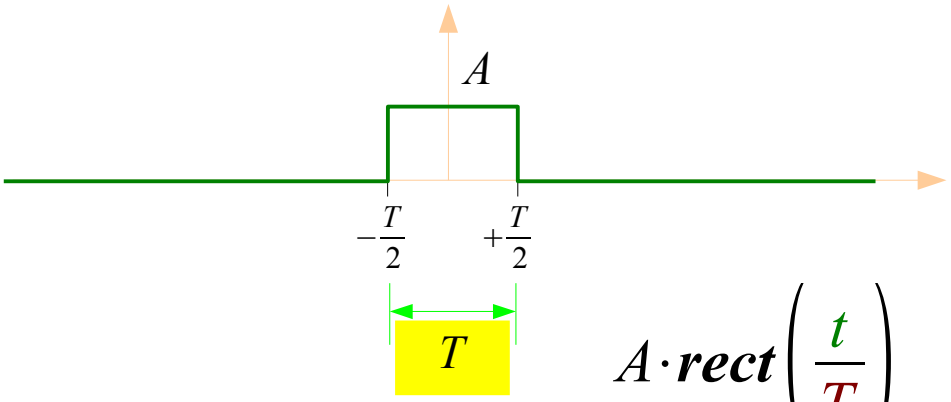
$$rect(t) = \begin{cases} 1 & \left(|t| < \frac{1}{2}\right) \\ 0 & \left(|t| > \frac{1}{2}\right) \end{cases}$$



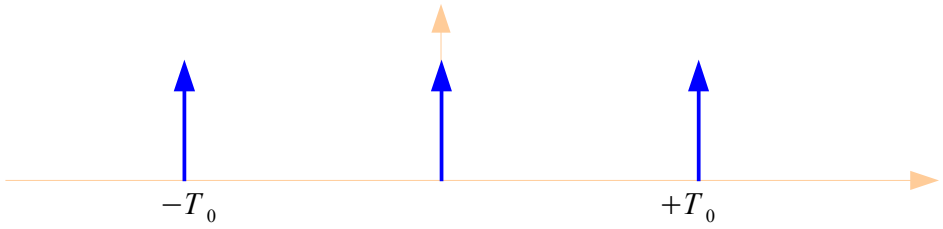




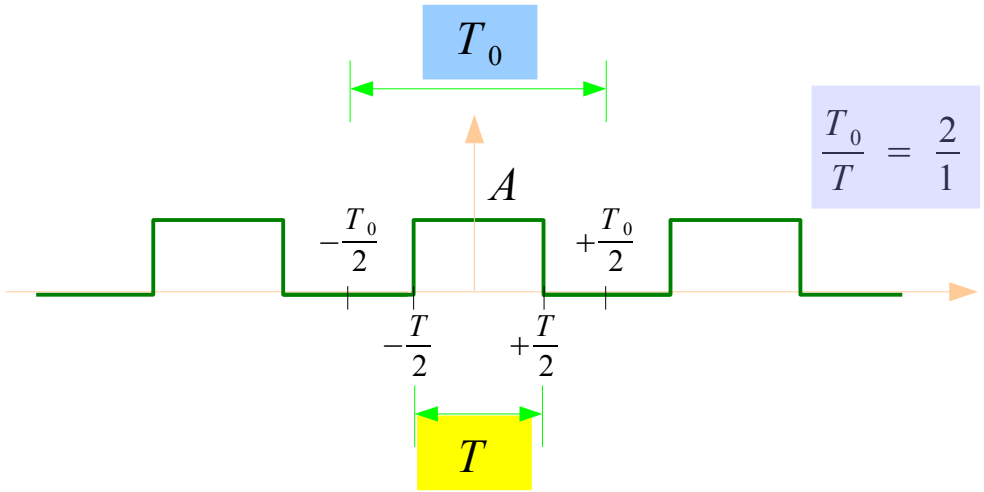
Periodic Pulse Train (1)



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

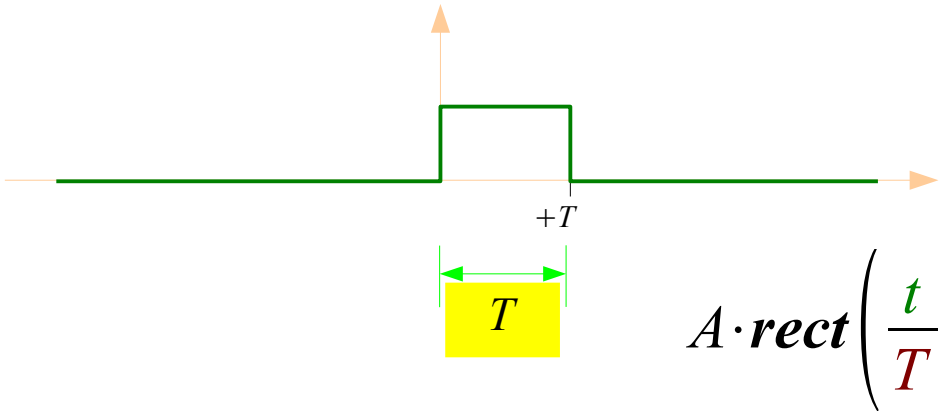


$$\delta_{T_0}(t)$$

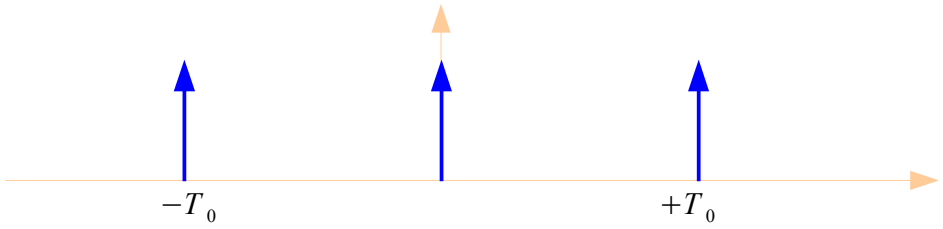


$$A \cdot rect\left(\frac{t}{T}\right) * \delta_{T_0}(t)$$

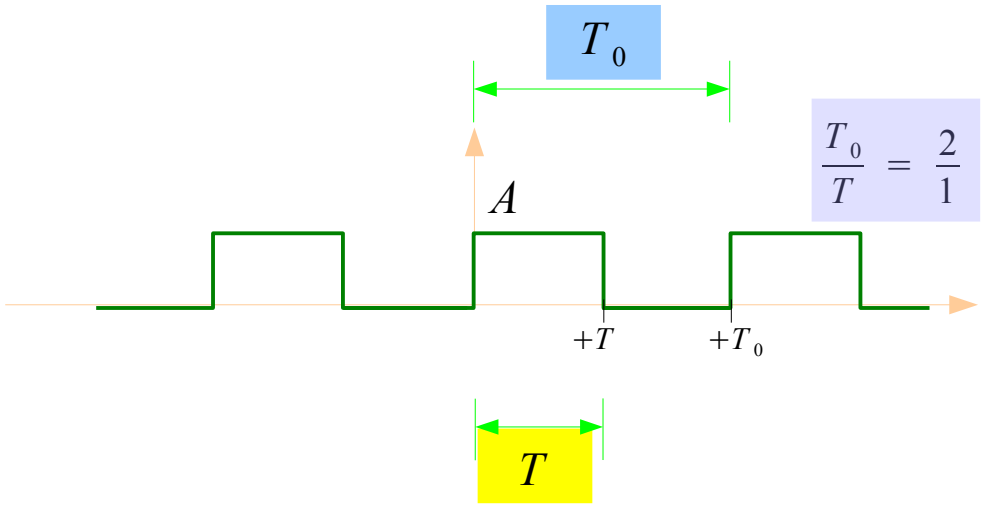
Periodic Pulse Train (2)



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



$$\delta_{T_0}(t)$$



$$\frac{T_0}{T} = \frac{2}{1}$$

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

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
[4] C. Langton, http://www.complextoreal.com/chapters/fft1.pdf
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