DT Rectangle Function (3B)

- Discrete Time Rectangle Function

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

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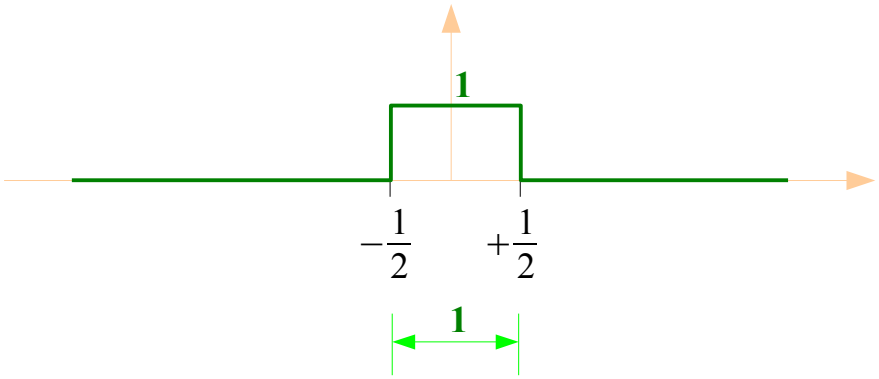
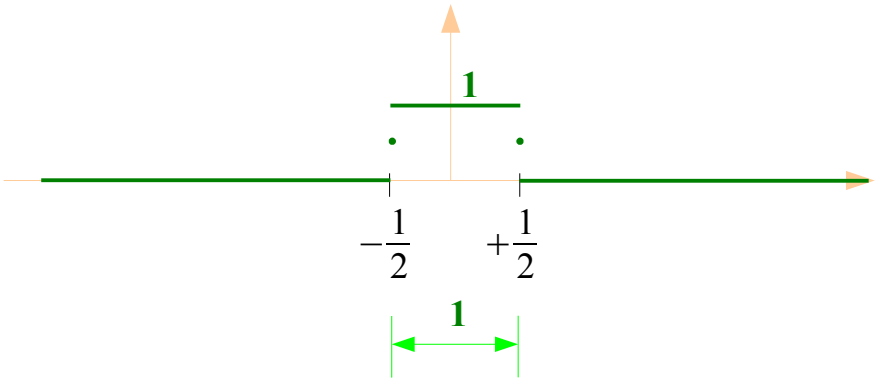
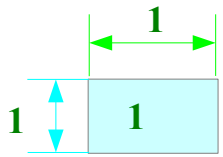
Rectangular Pulse (1)

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

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





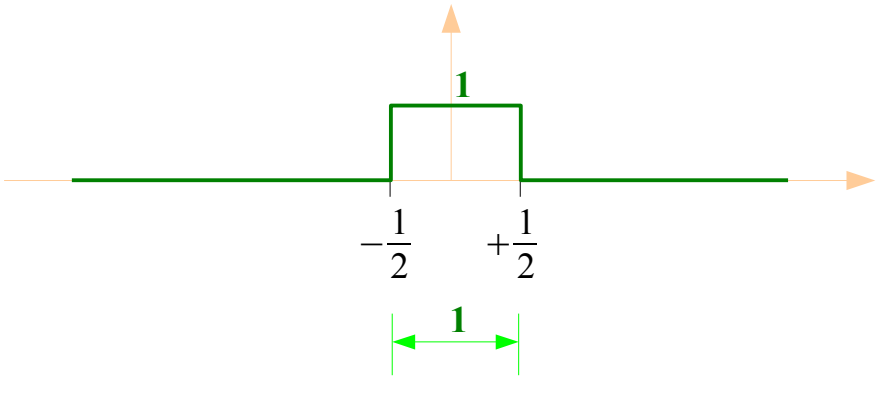


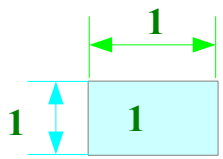
Unit Rectangle Function
Rectangular Pulse Function

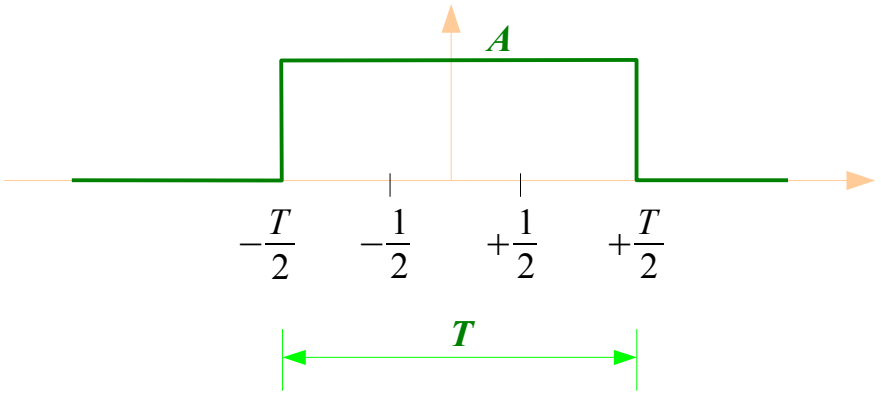
Rectangular Pulse (2)

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

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





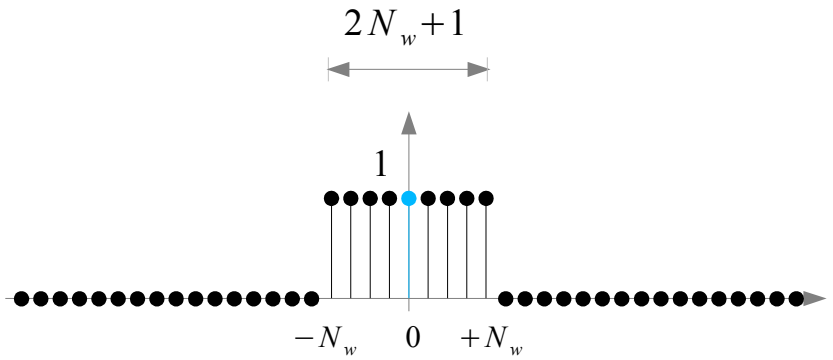


$$t = -\frac{T}{2} \qquad t = +\frac{T}{2}$$

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

$Rect_{N_w}[n]$

$$rect_{N_w}[n] = \begin{cases} 1 & (|n| \le N_w) \\ 0 & (|n| > N_w) \end{cases}$$



Octave Rect Functions

```
function y = Drect
        if  W == round(W),
                y = double(abs(n) <= abs(W));
                nn = find(round(n) ~= n);
                y(nn) = NaN;
        else
                disp('W must be integer');
        end
```

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
[5] S. Haykin, An Introduction to Analog & Digital Communications, 1989