

DT Rectangle Function (3B)

- Discrete Time Rectangle Function

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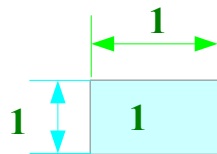
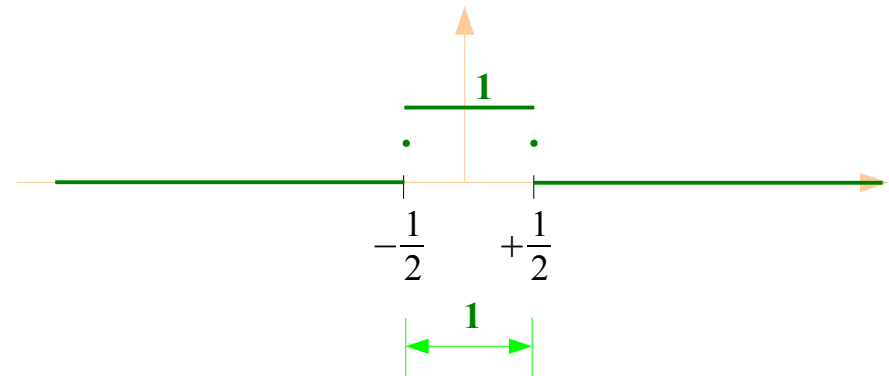
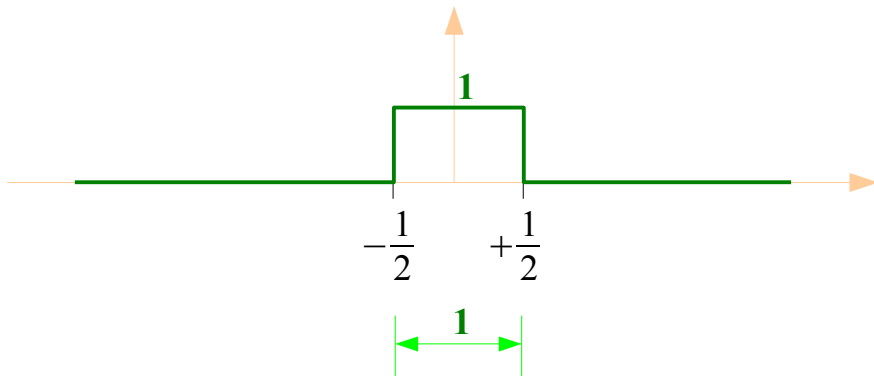
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Rectangular Pulse (1)

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

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

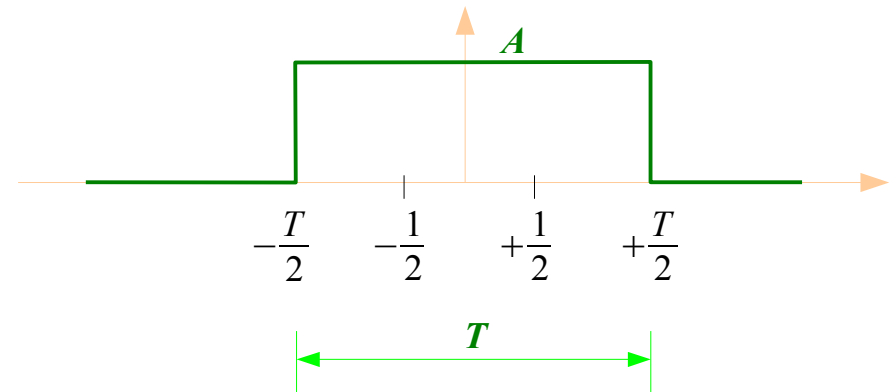
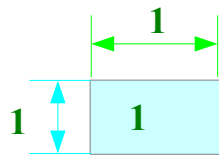
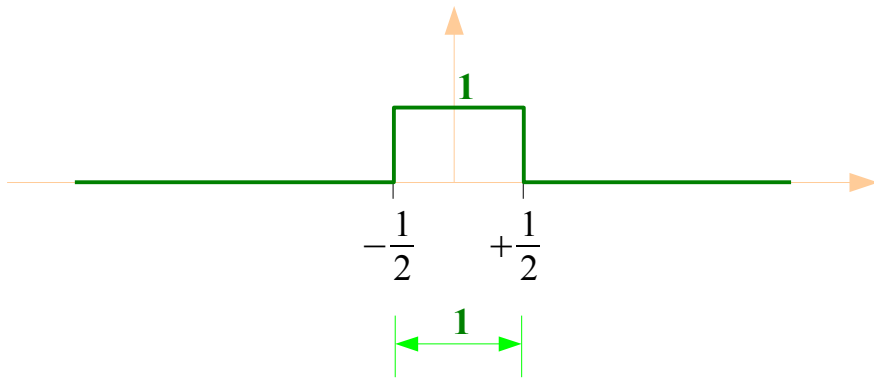


Unit Rectangle Function
Rectangular Pulse Function

Rectangular Pulse (2)

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

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



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



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

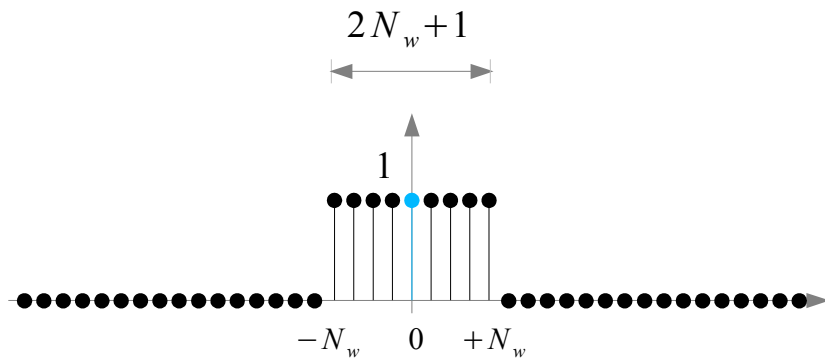
$$t = +\frac{T}{2}$$



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

Rect_{N_w}[n]

$$\text{rect}_{N_w}[n] = \begin{cases} 1 & (|n| \leq N_w) \\ 0 & (|n| > N_w) \end{cases}$$



Octave Rect Functions

```
function y = Direct
    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