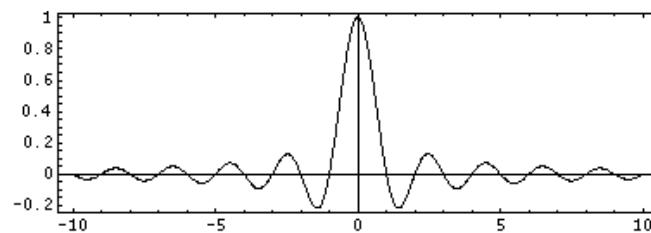


- Sinc Function
- Digital Sinc Function
- Nyquist Criterion
- Nyquist Sampling Theorem
- As a Fourier Transform for the Rectangular Window

- Sinc Function

$$\text{sinc}(x) \triangleq \frac{\sin \pi x}{\pi x}$$



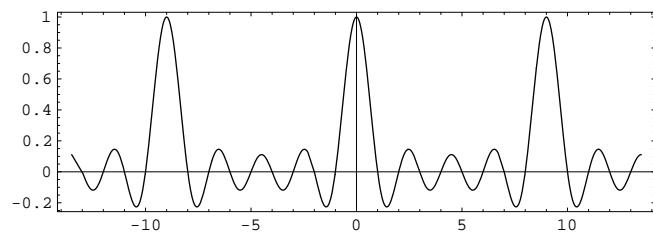
Determine the value at $x=0$ by using L'Hôpital's Rule:

$$\lim_{x \rightarrow 0} \frac{\sin \pi x}{\pi x} = \lim_{x \rightarrow 0} \frac{\frac{d}{dx}(\sin \pi x)}{\frac{d}{dx}(\pi x)} = \lim_{x \rightarrow 0} \frac{\pi \cos \pi x}{\pi} = 1$$

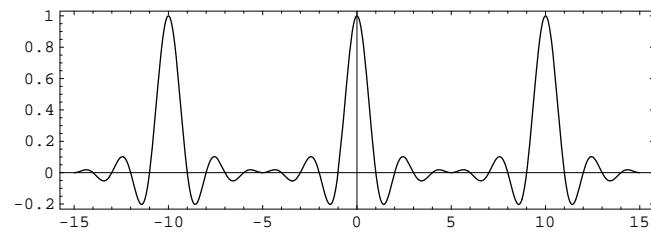
- Digital Sinc Function

$$\text{sinc}_M(x) \triangleq \begin{cases} \frac{\sin \pi x}{M \sin \frac{\pi x}{M}} & \text{for } M \text{ odd} \\ \frac{\sin \pi x \cos \frac{\pi x}{M}}{M \sin \frac{\pi x}{M}} & \text{for } M \text{ even} \end{cases}$$

sinc_M for M odd (9):



sinc_M for M even (10):



- Nyquist Criterion

- Nyquist Sampling Theorem

- As a Fourier Transform