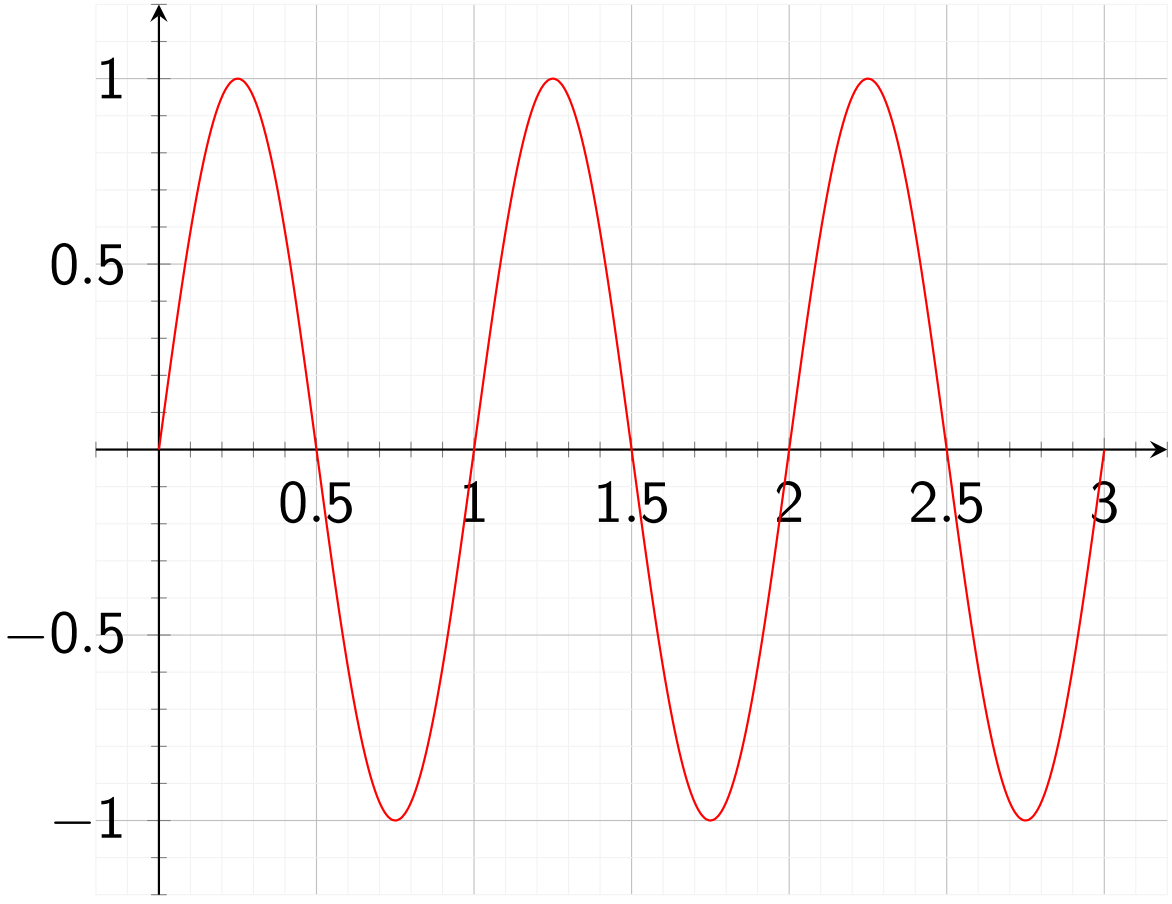
IS2111

Computer Networks

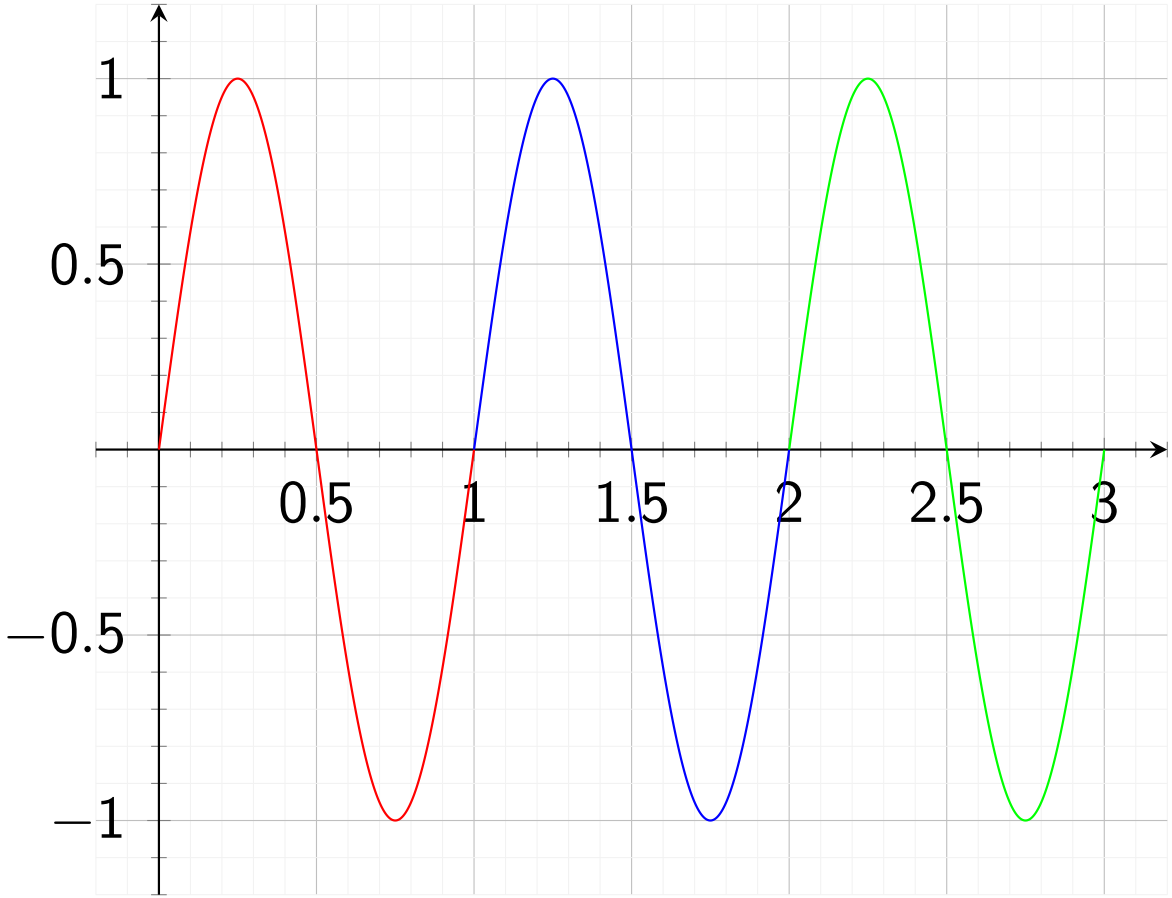
Dr. Chamath Keppitiyagama

University of Colombo School of Computing

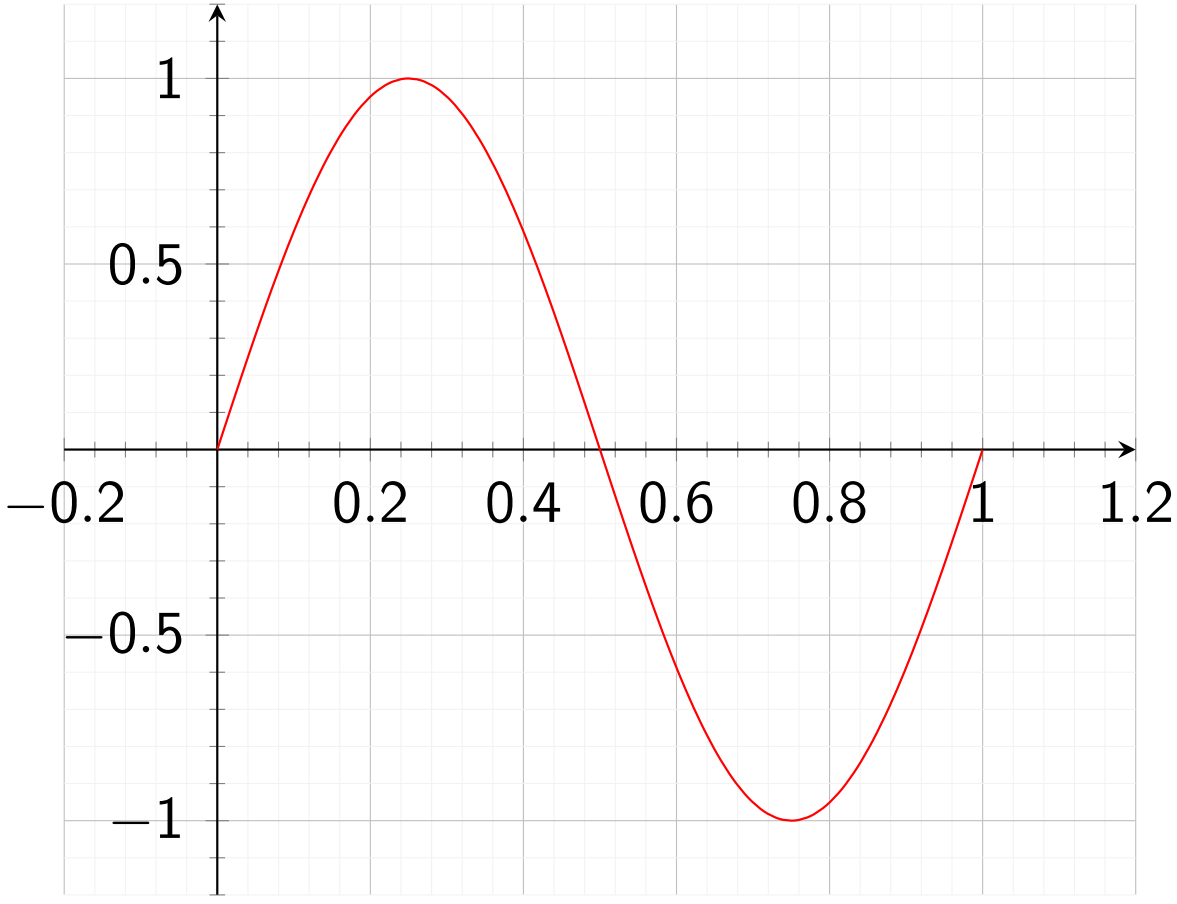
Sine Wave (sinusoid)



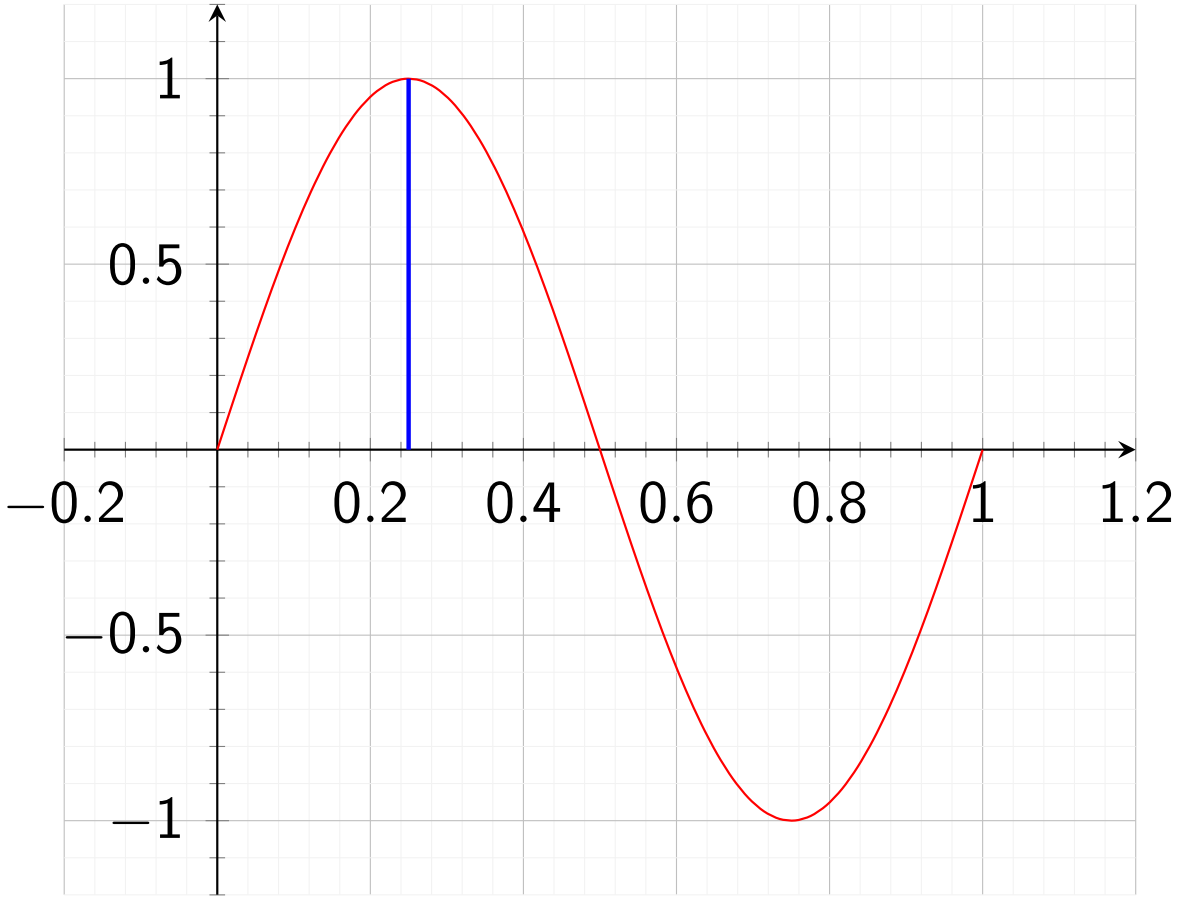
Sine Wave - Cycles



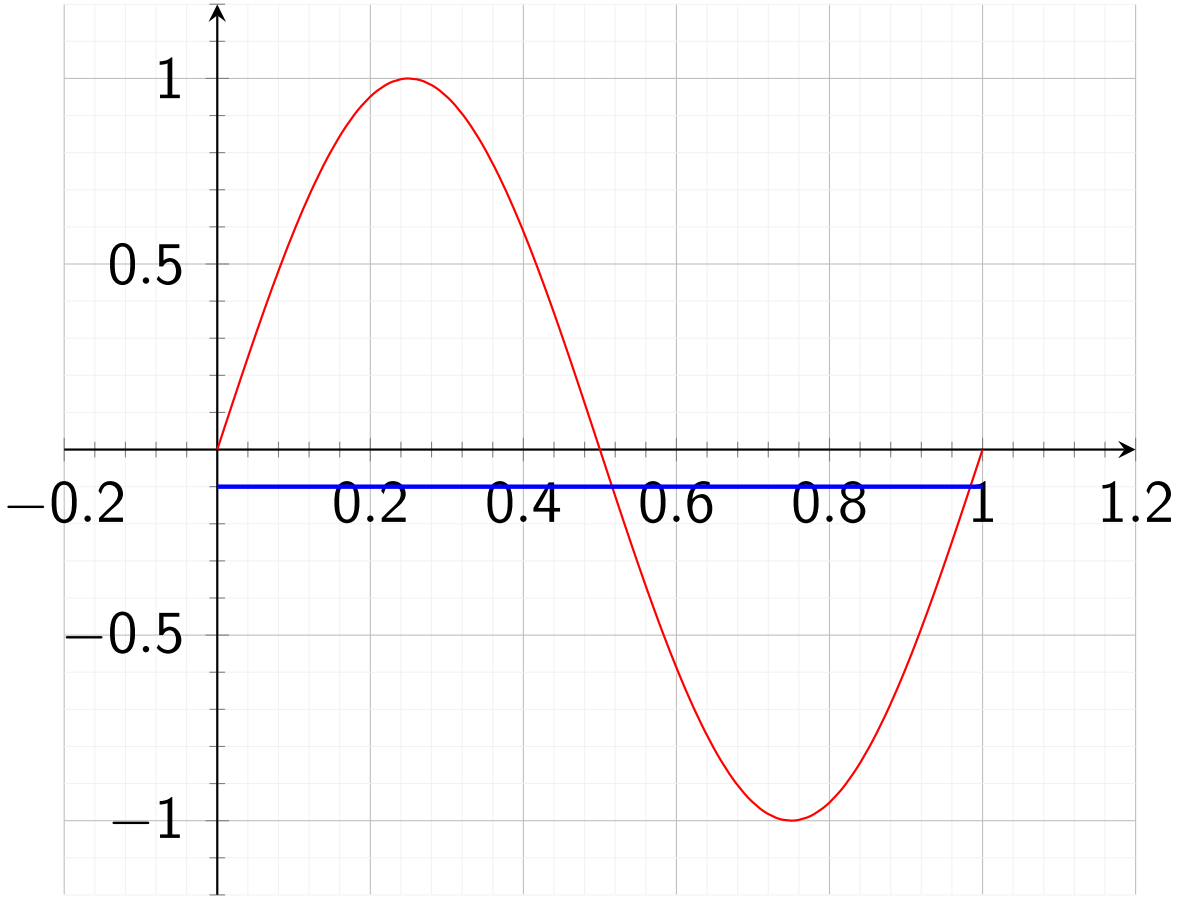
Sine Wave - One Cycle



Amplitude



Periodic Signal - Period



Frequency

Number of cycles per second.

$$Period = 1s$$

$$Frequency = 1Hz$$

Frequency

Number of cycles per second.

$$Period = 1ms$$

$$Frequency = 1000Hz = 1KHz$$

Speed of Light

$$300,000 Kms^{-1}$$

Wave Length - Frequency $1Hz$

$$300,000Km$$

Wave Length - Frequency $1000Hz$

$$\frac{300,000Km}{1000} = 300Km$$

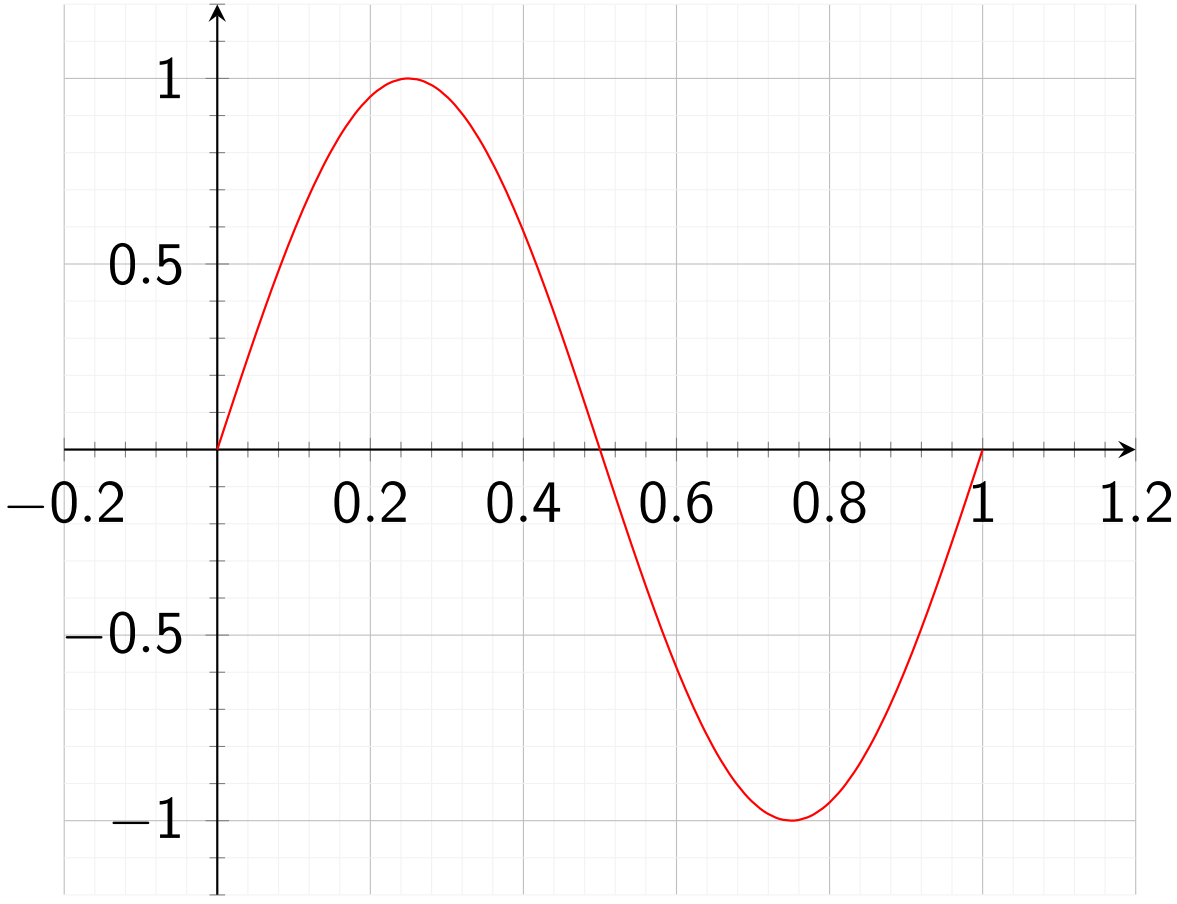
Wave Length - Frequency $1MHz$

$$\frac{300,000Km}{1000000} = 0.3Km = 300m$$

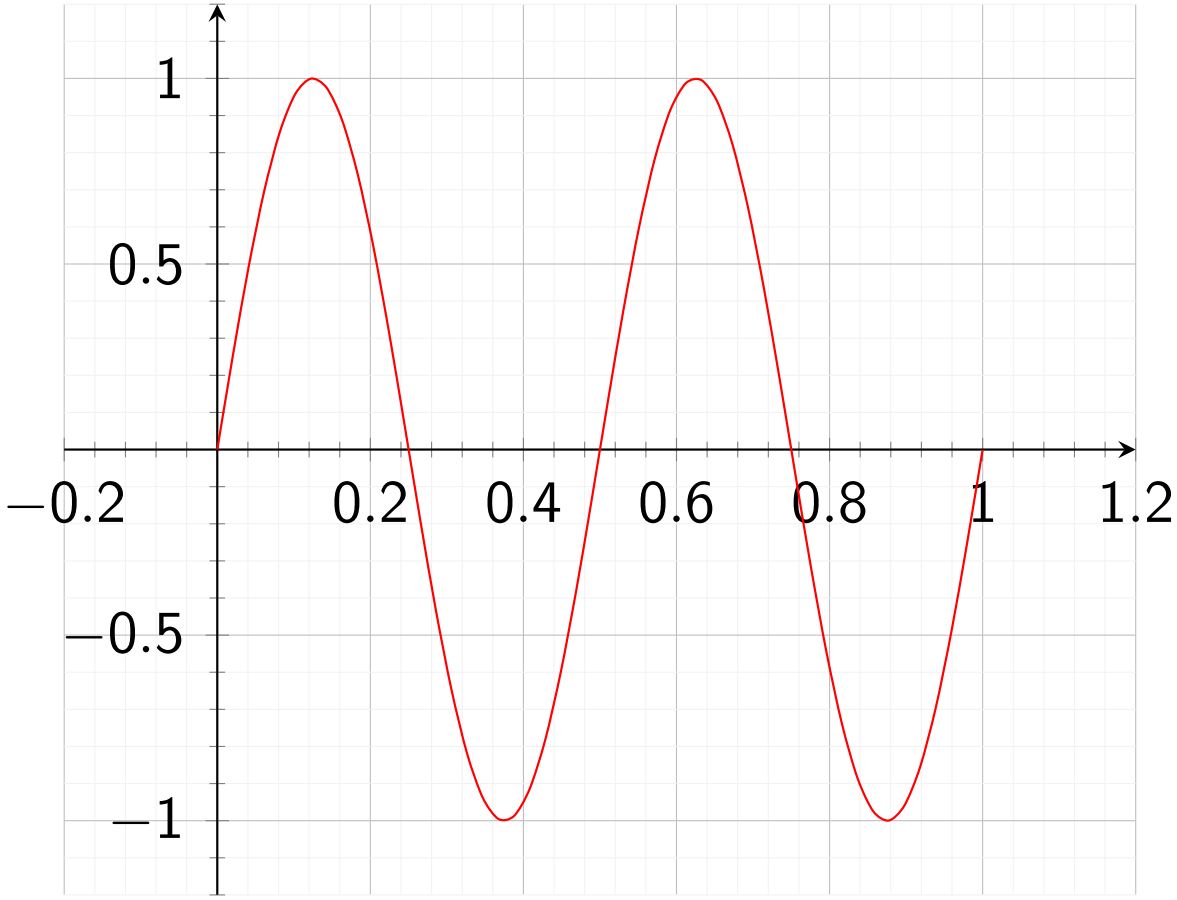
Wave Length (λ), Frequency (f), and Speed of Light (c)

$$\lambda = \frac{c}{f}$$

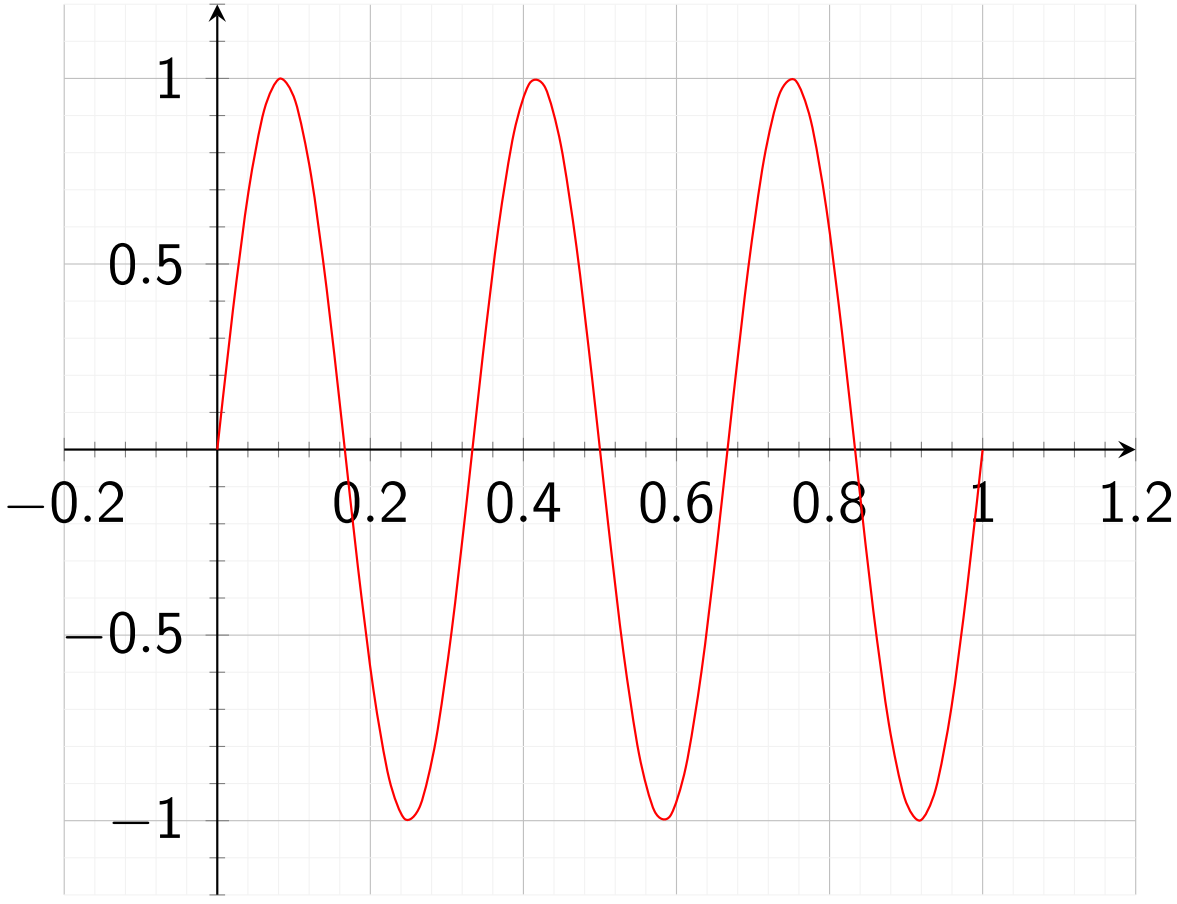
$y = sin(x)$



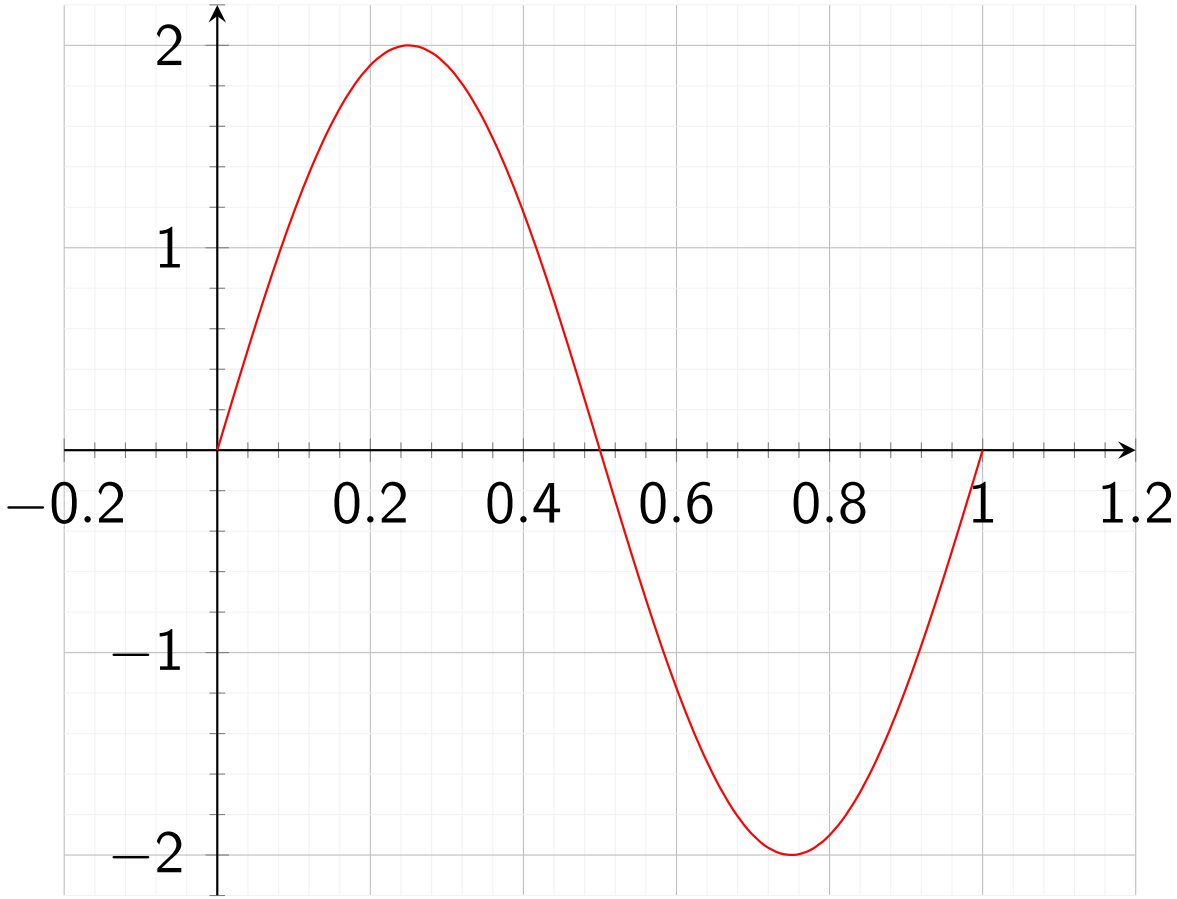
$y = sin(2x)$



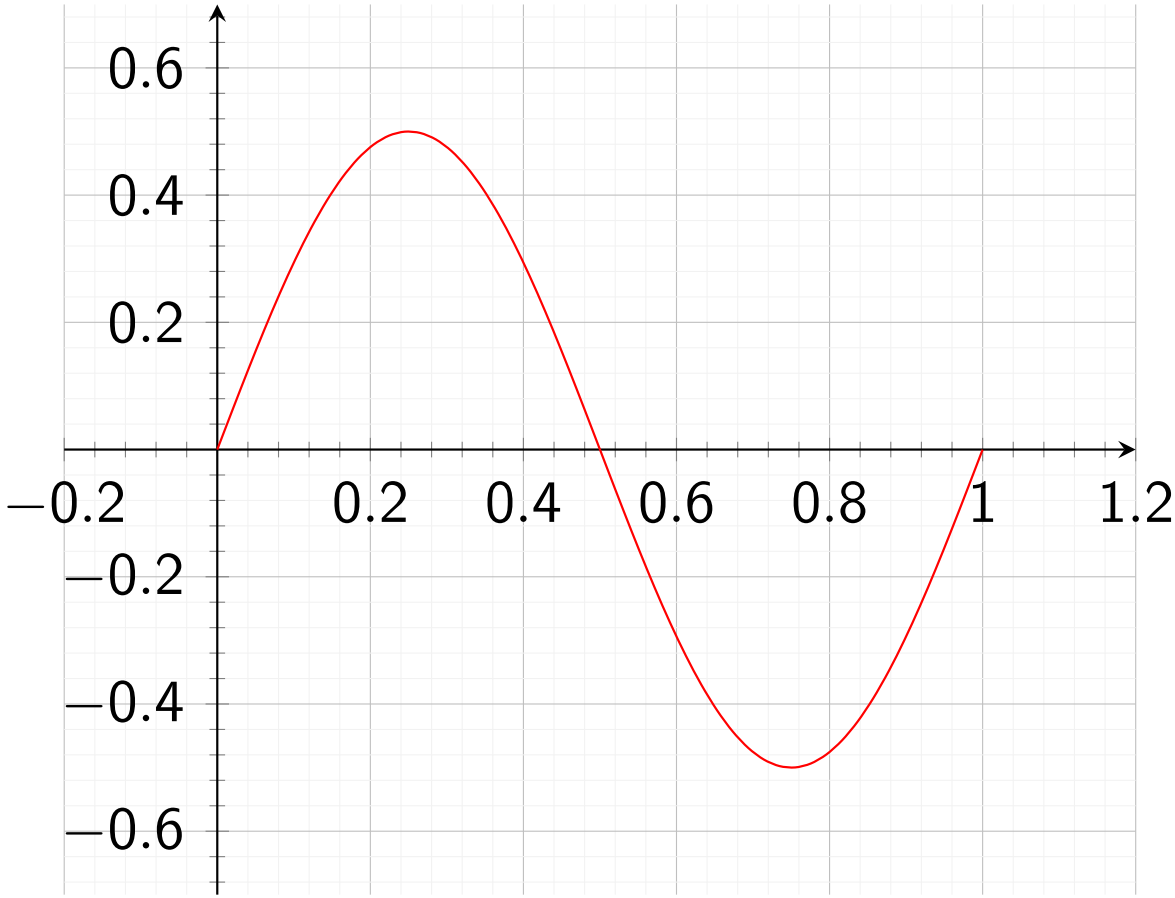
$y = sin(3x)$



$y = 2sin(x)$

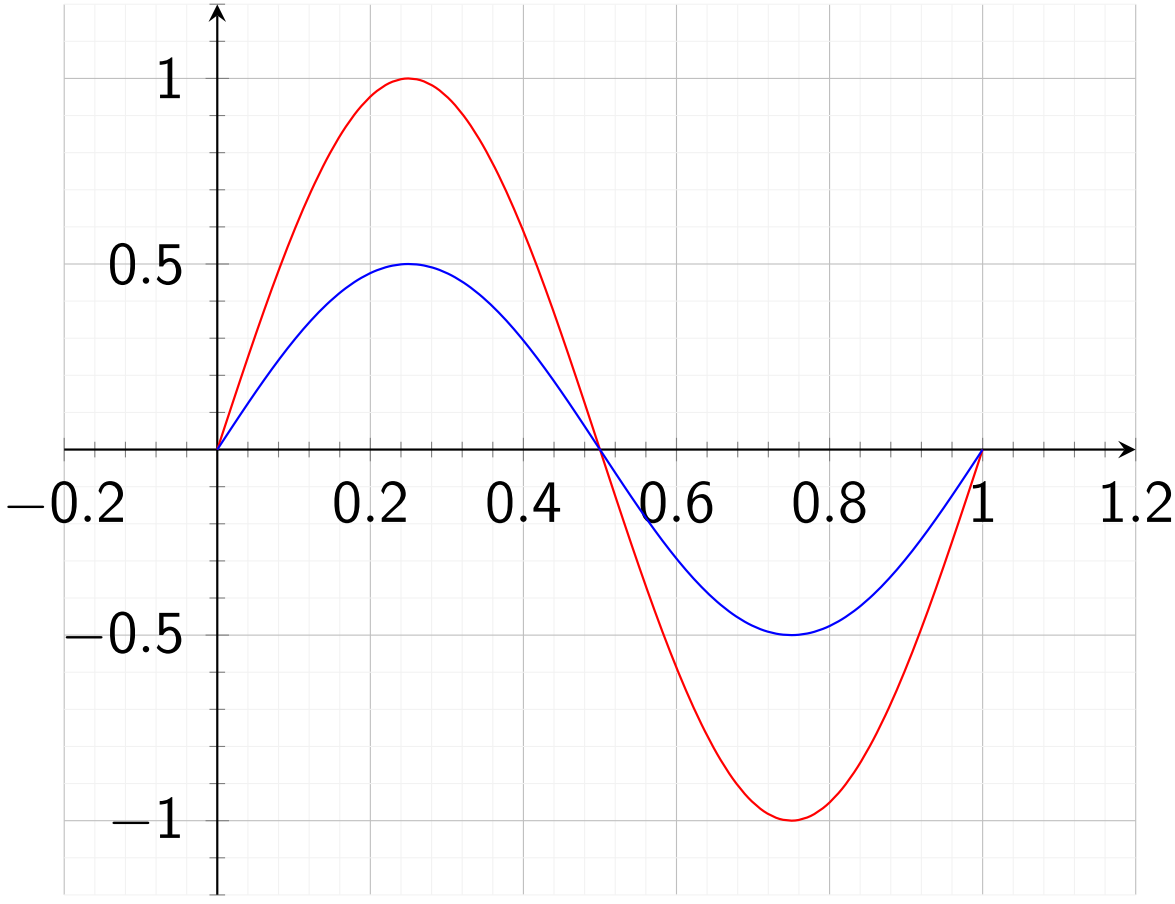


$y = 0.5sin(x)$

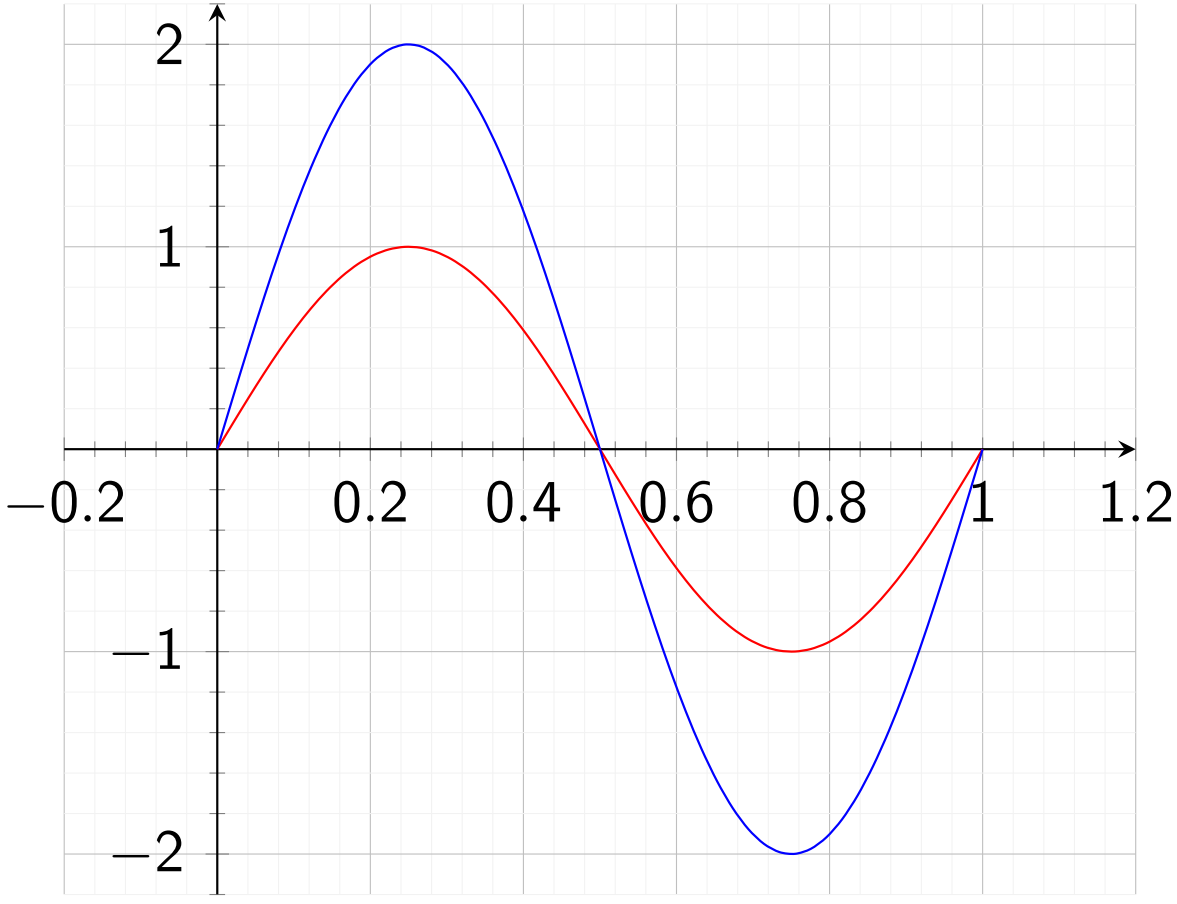


$$y = A\ sin(2\pi fx)$$

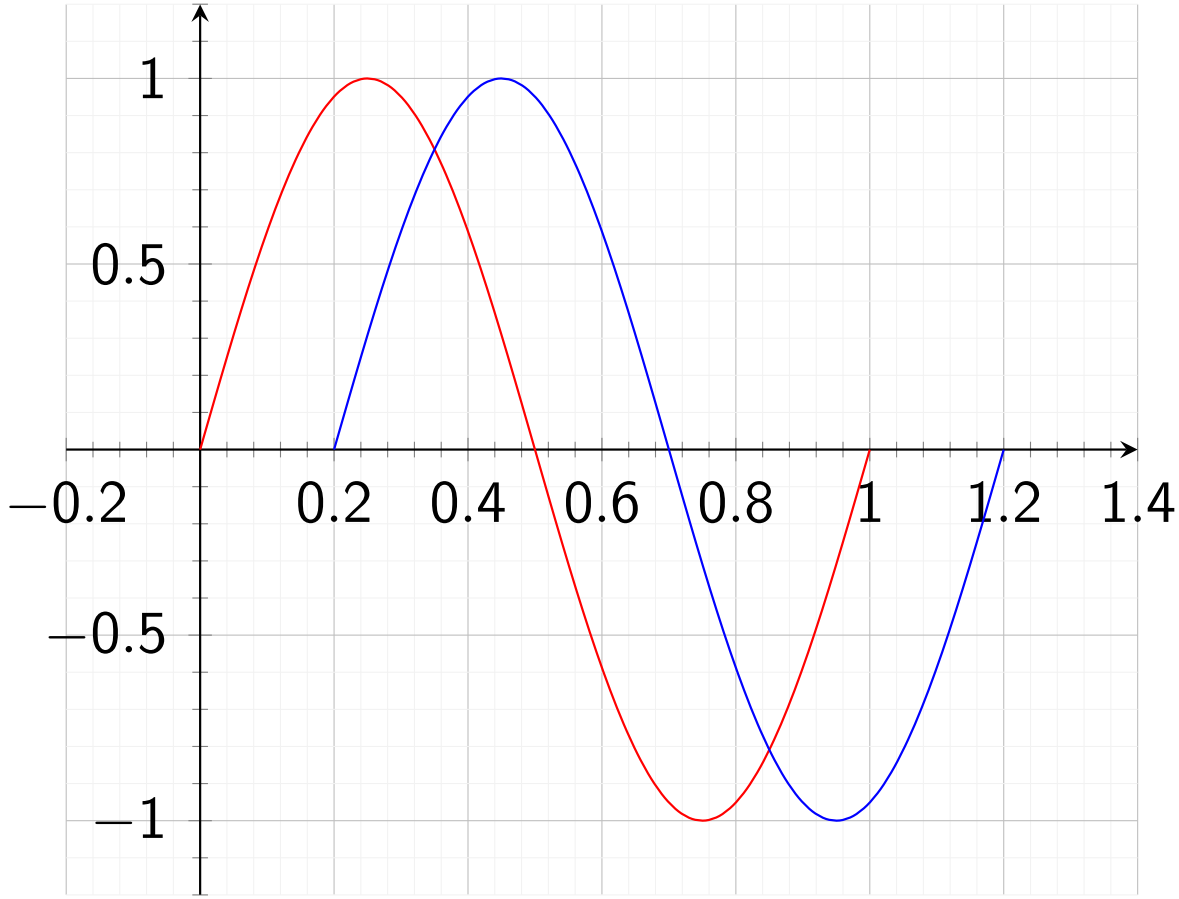
Attenuation



Amplification

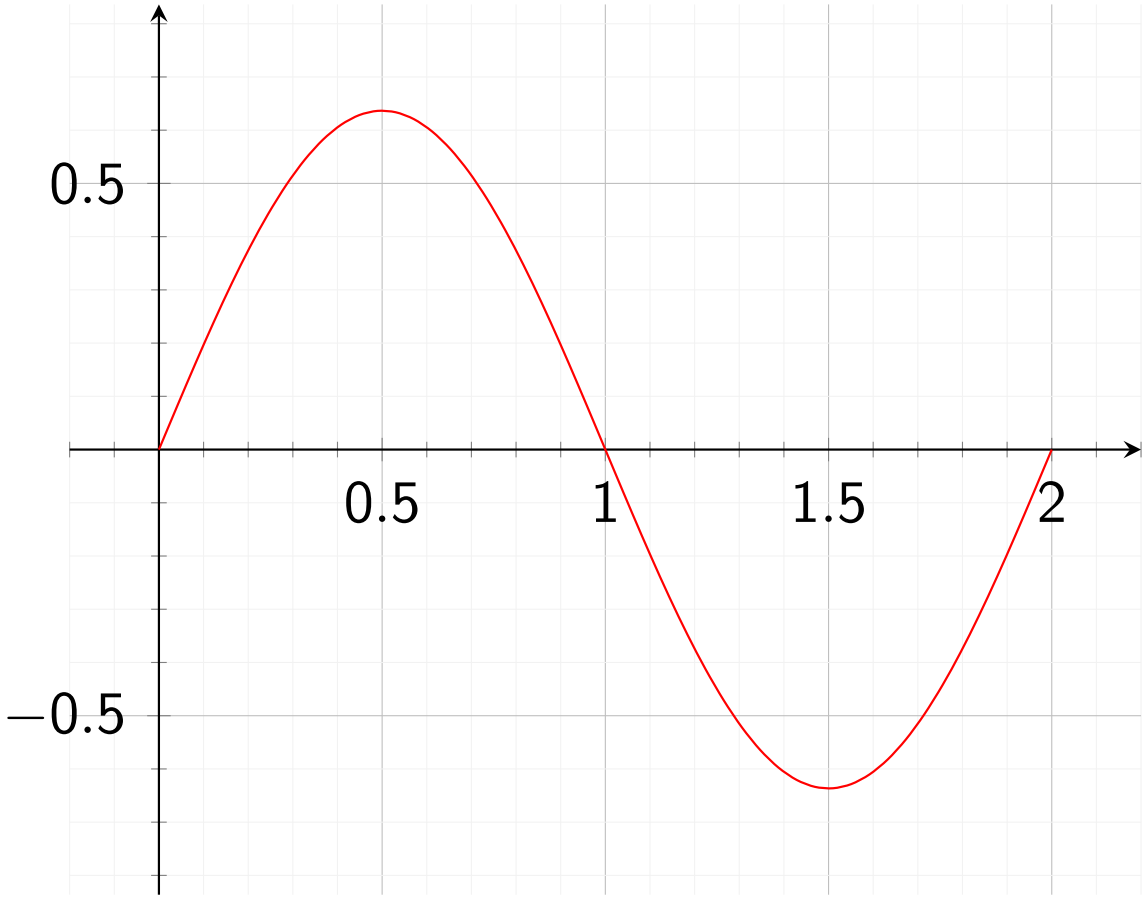


Delay

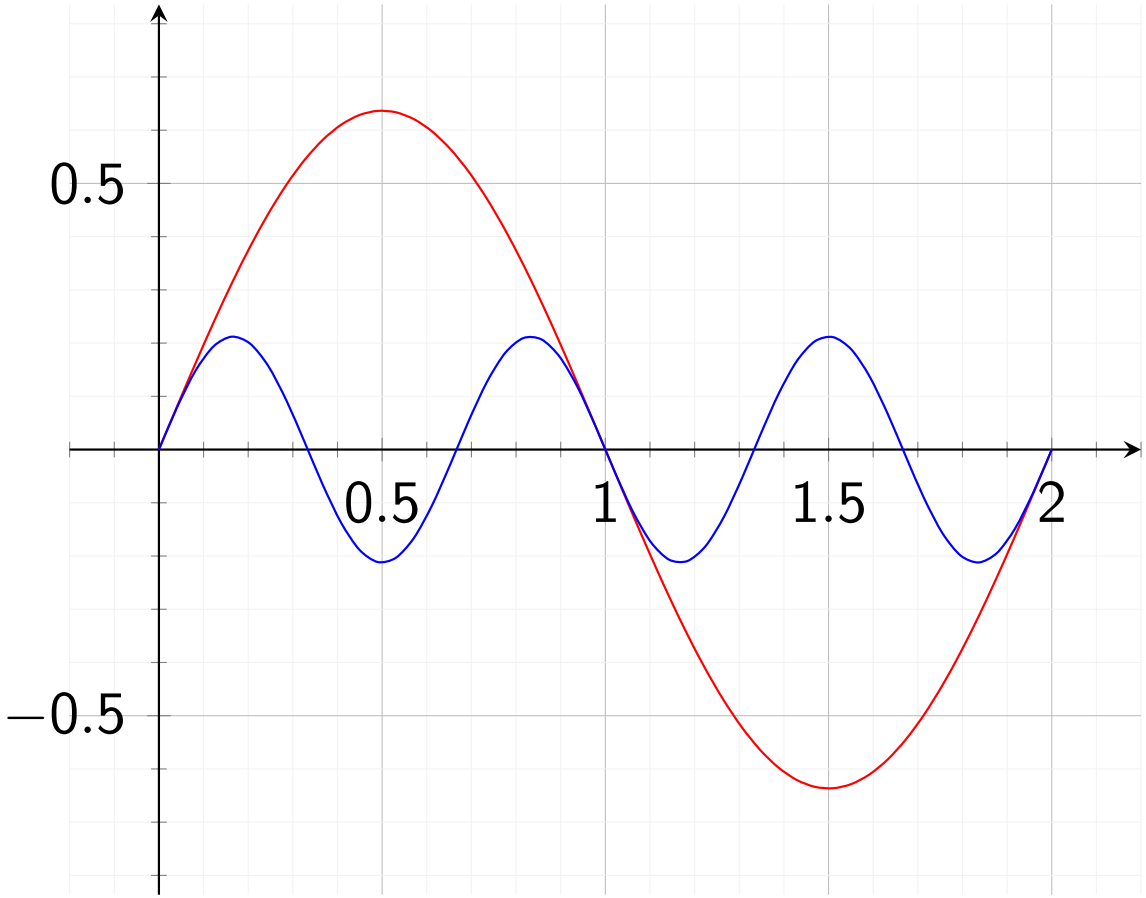


Noise

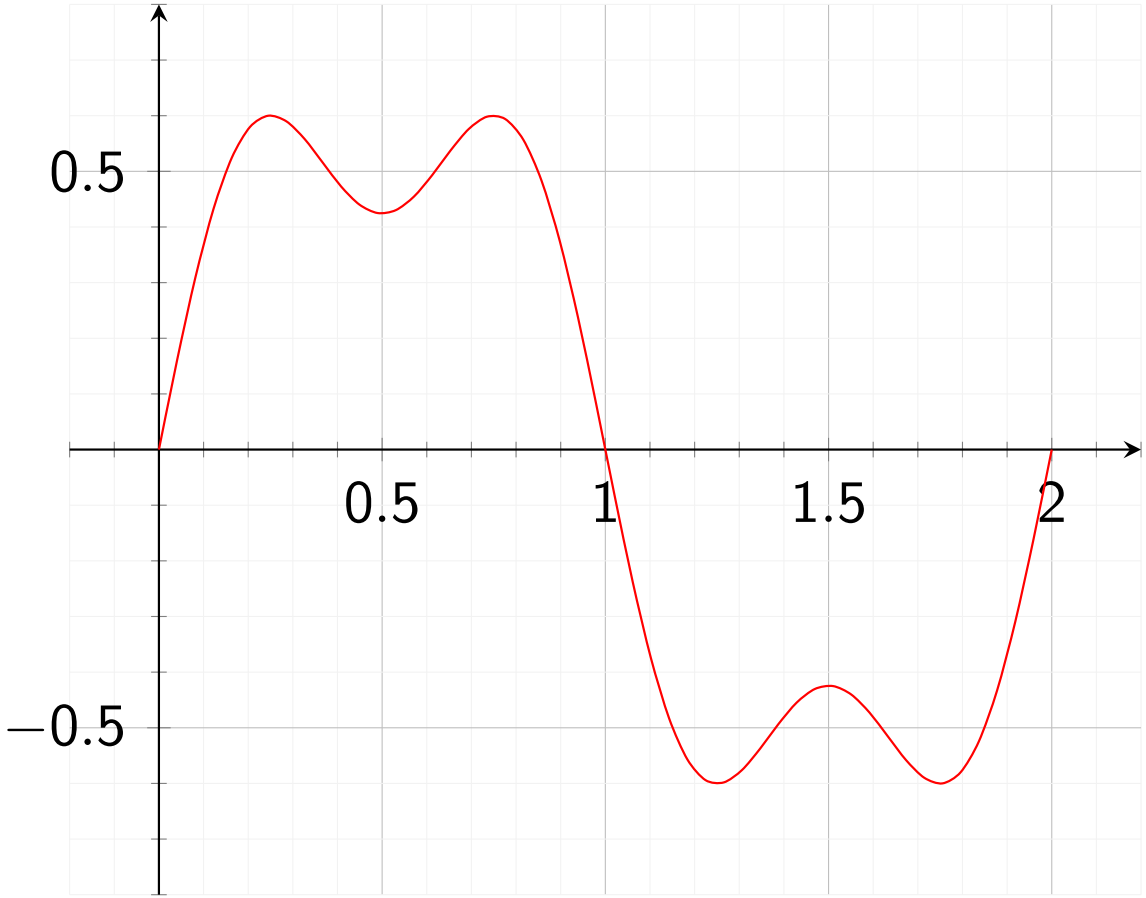
$\frac{2}{\pi} sin(x)$



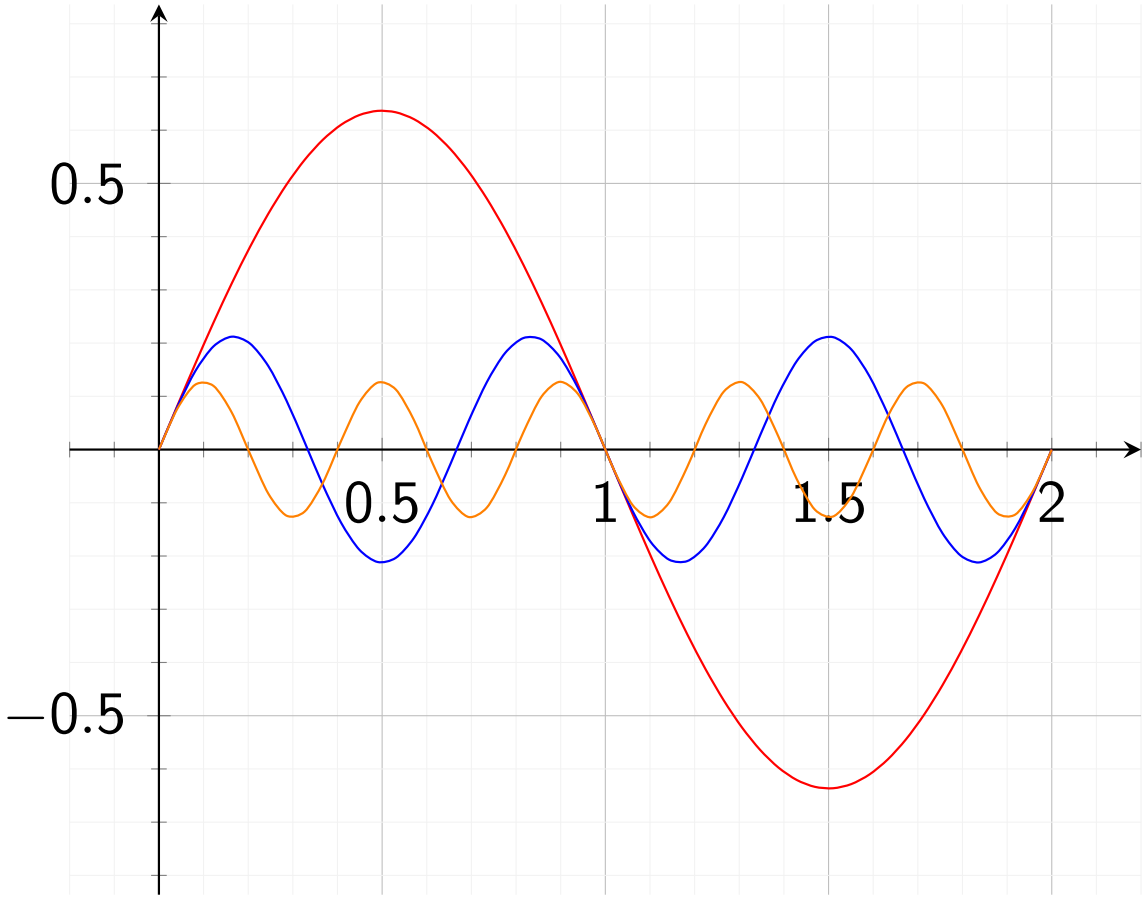
$\frac{2}{\pi}sin(x)$ and $\frac{2}{3\pi}sin(3x)$



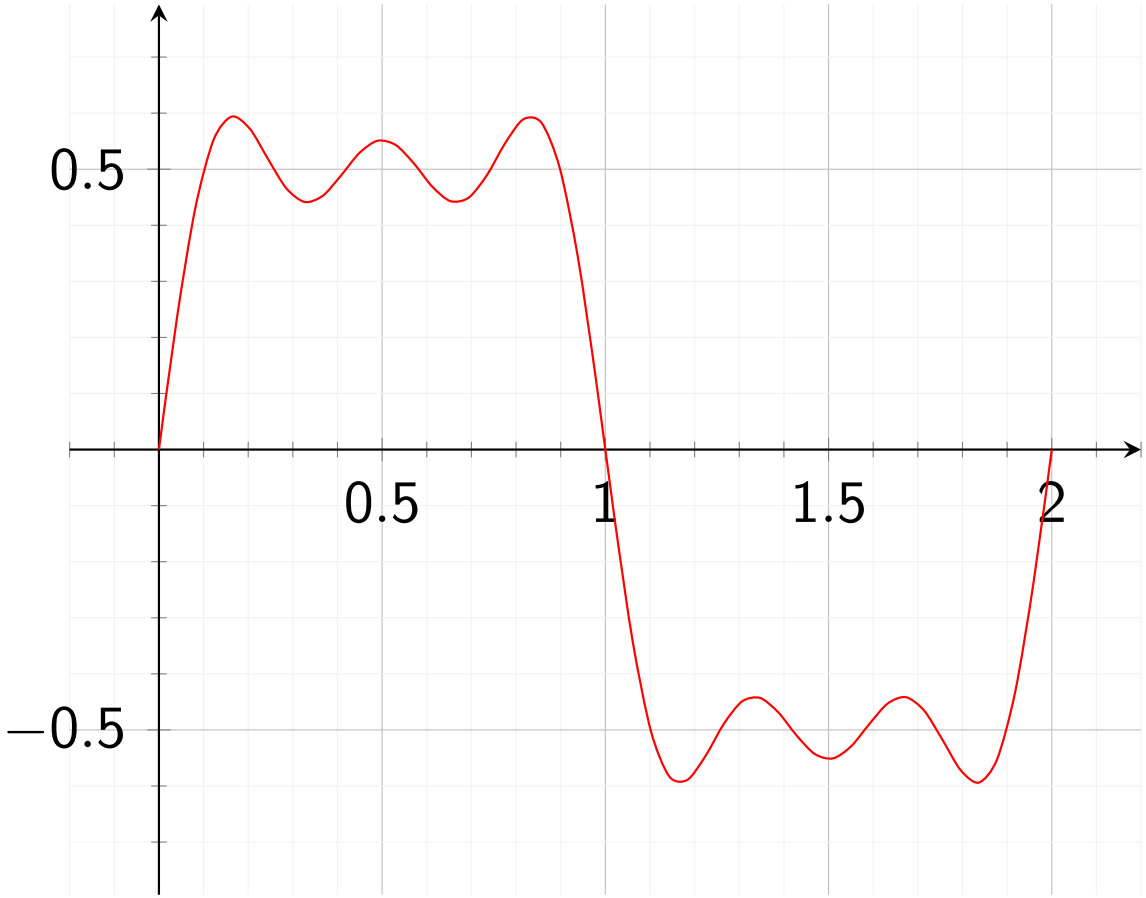
$\frac{2}{\pi}sin(x) + \frac{2}{3\pi}sin(3x)$



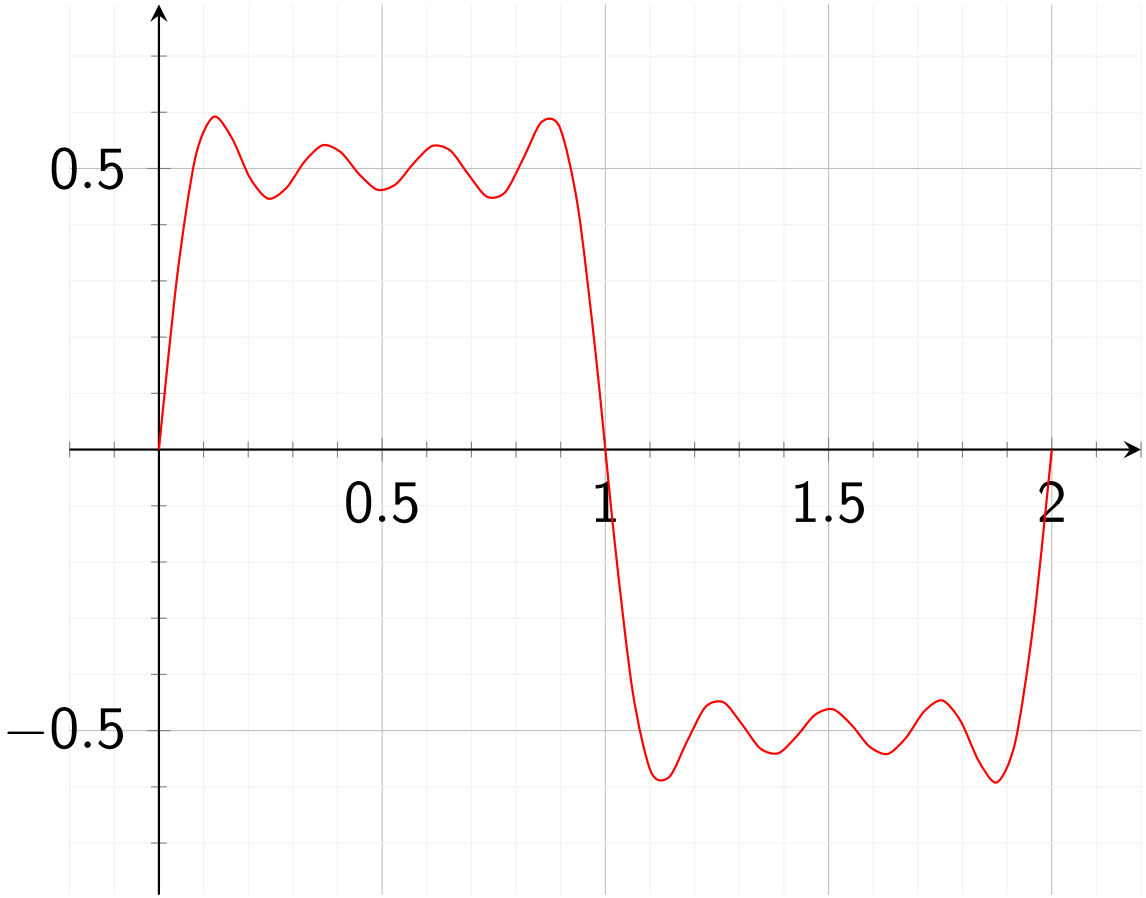
$\frac{2}{\pi}sin(x)$ and $\frac{2}{3\pi}sin(3x)$ and $\frac{2}{5\pi}sin(5x)$



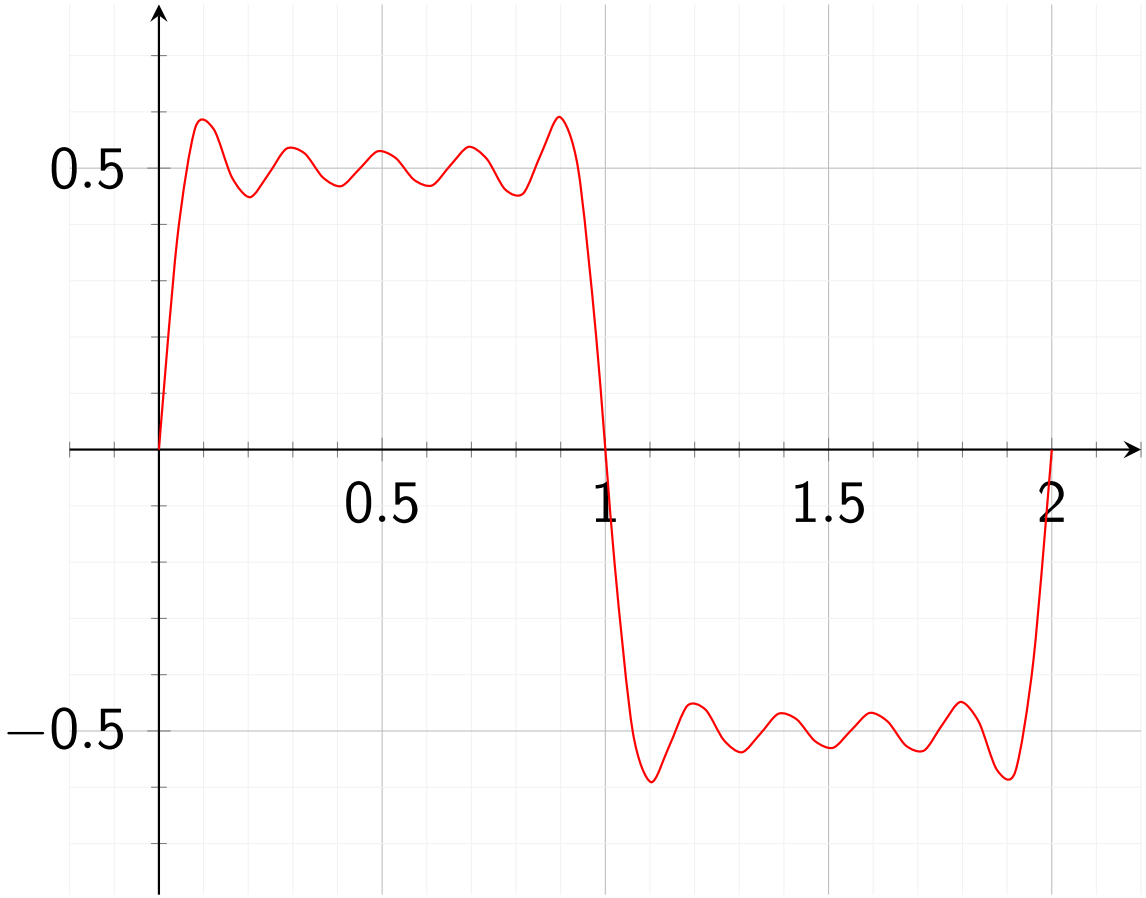
$$\frac{2}{\pi}sin(x) + \frac{2}{3\pi}sin(3x) + \frac{2}{5\pi}sin(5x)$$



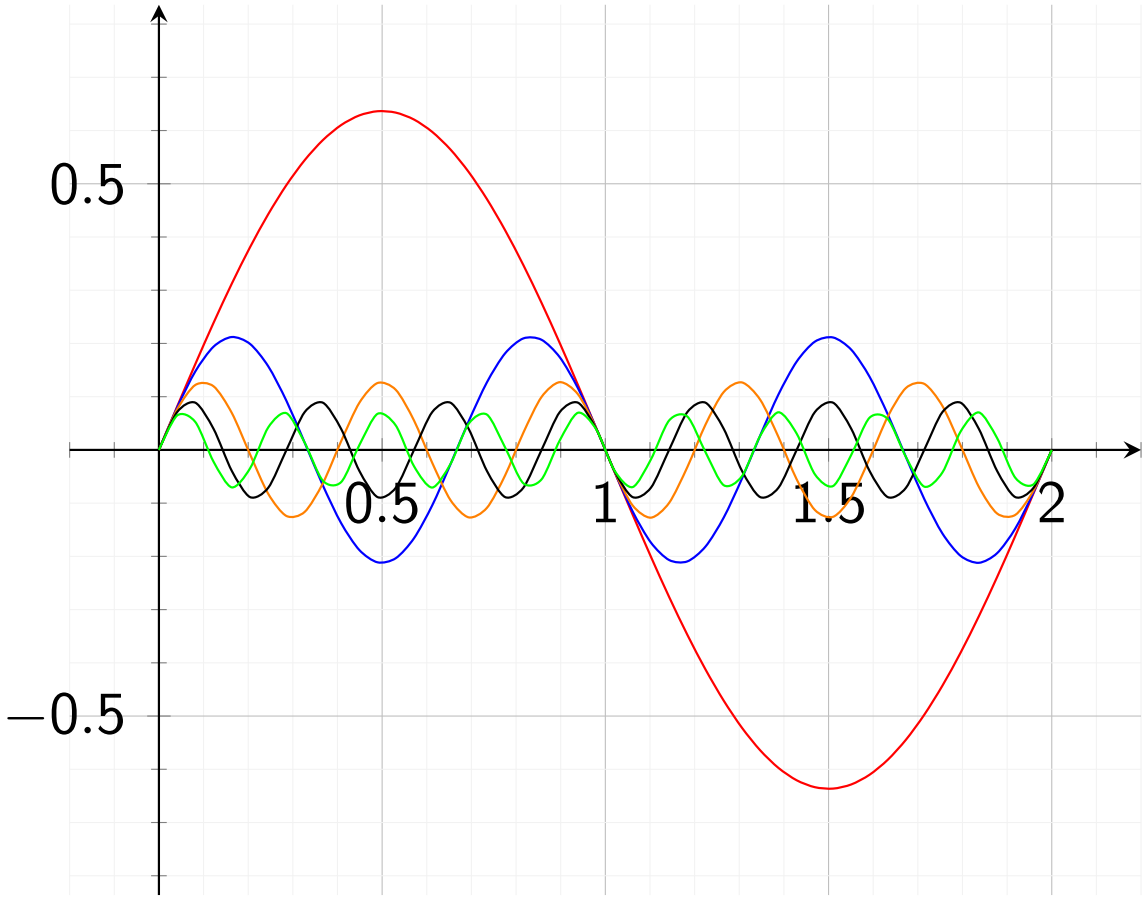
$$\frac{2}{\pi}sin(x) + \frac{2}{3\pi}sin(3x) + \frac{2}{5\pi}sin(5x) + \frac{2}{7\pi}sin(7x)$$



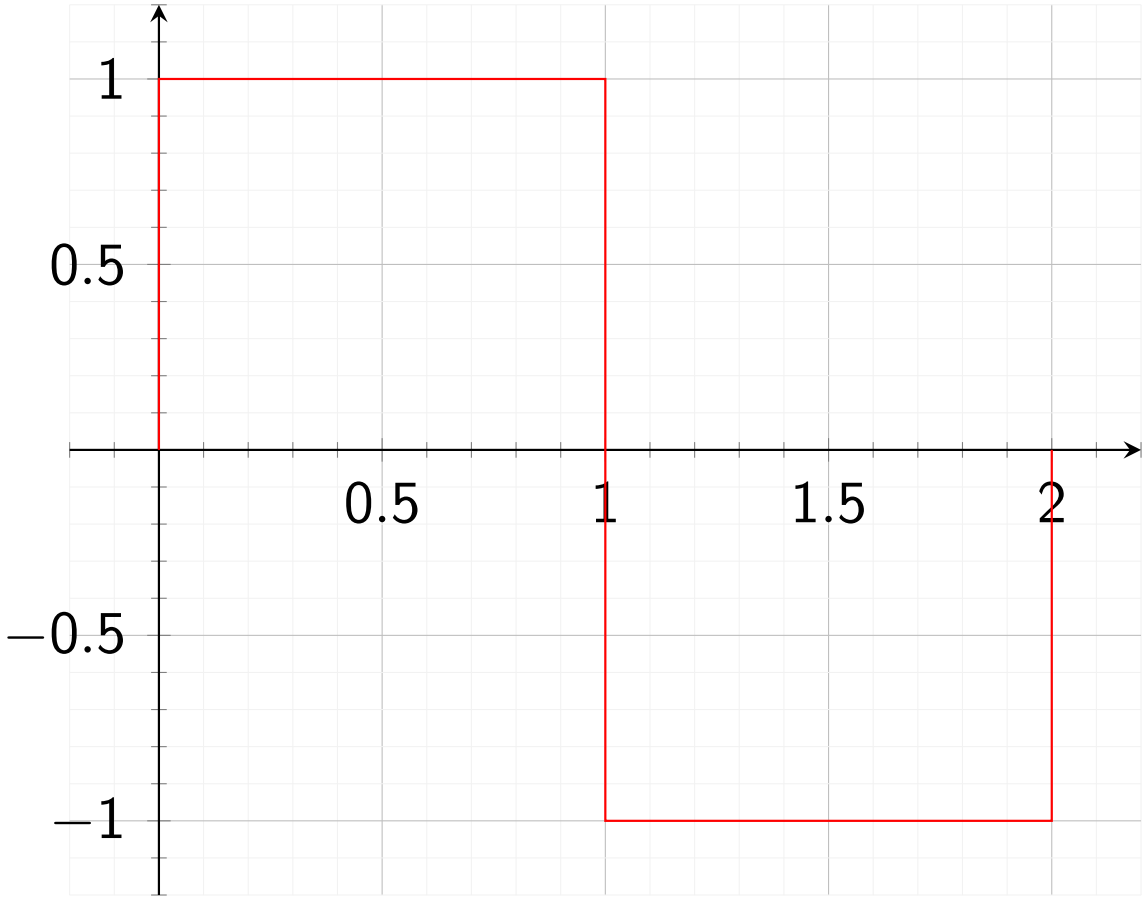
$$\frac{2}{\pi}sin(x) + \frac{2}{3\pi}sin(3x) + \frac{2}{5\pi}sin(5x) + \frac{2}{7\pi}sin(7x) + \frac{2}{9\pi}sin(9x)$$



$\frac{2}{\pi}sin(x)$ and $\frac{2}{3\pi}sin(3x)$ and $\frac{2}{5\pi}sin(5x)$ and $\frac{2}{7\pi}sin(7x)$ and $\frac{2}{9\pi}sin(9x)$



$$\frac{2}{\pi}sin(x) + \frac{2}{3\pi}sin(3x) + \frac{2}{5\pi}sin(5x) + \frac{2}{7\pi}sin(7x) + \frac{2}{9\pi}sin(9x) + \frac{2}{11\pi}sin(11x) + \frac{2}{13\pi}sin(13x) \ldots \rightarrow \infty$$



Fourier Transform

"In mathematics, a Fourier transform (FT) is a mathematical transform that decomposes a function (often a function of time, or a signal) into its constituent frequencies ... "

Wikipedia