

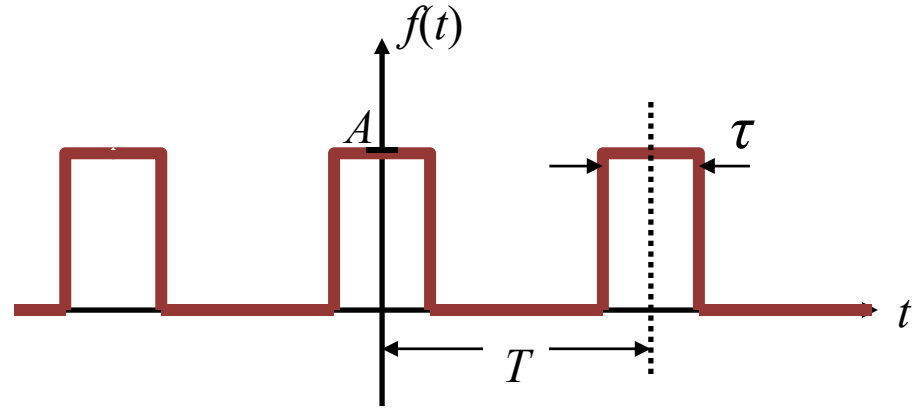
Fourier Series of a Pulse Train

$$a_0 = A \frac{\tau}{T}$$

$$b_k = 0$$

$$a_k = \frac{2A}{k\pi} \sin\left(k\pi \frac{\tau}{T}\right)$$

$$c_k = \frac{A}{k\pi} \sin\left(k\pi \frac{\tau}{T}\right)$$

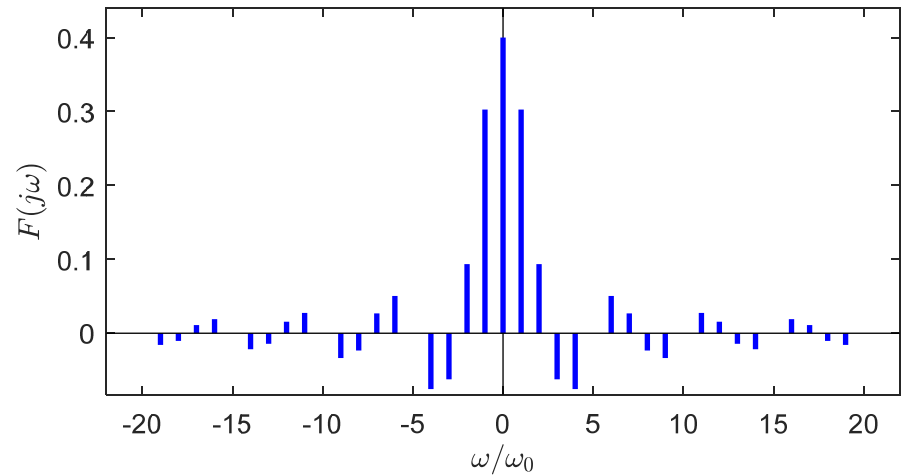
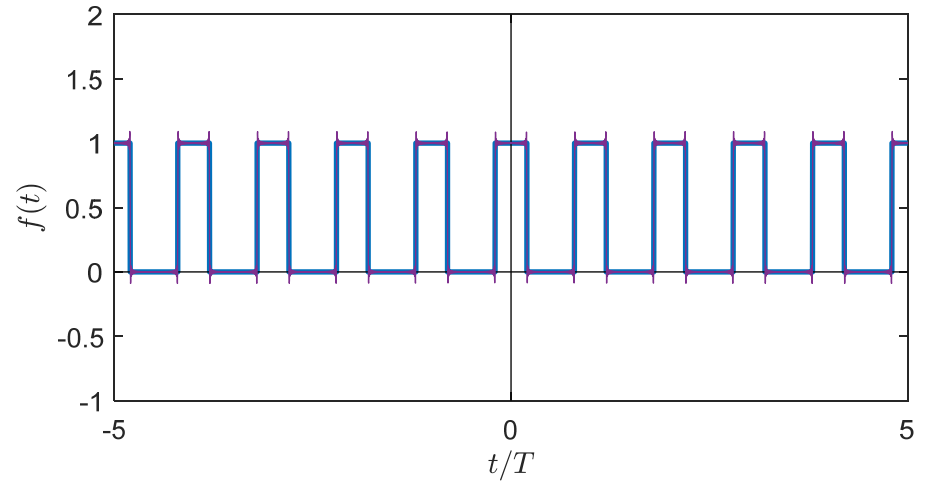


Example Matlab Calculation

$$f = 200 \text{ Hz}$$

$$T = 5 \text{ ms}$$

$$\tau = 2 \text{ ms}$$

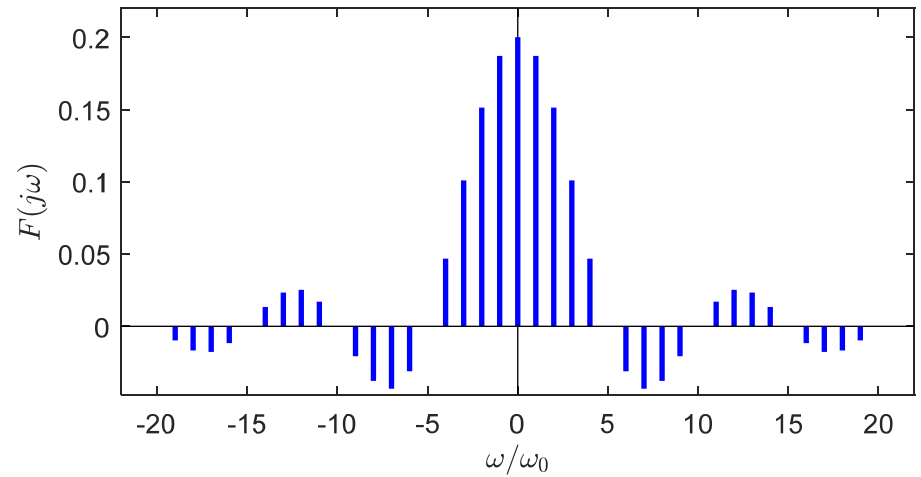
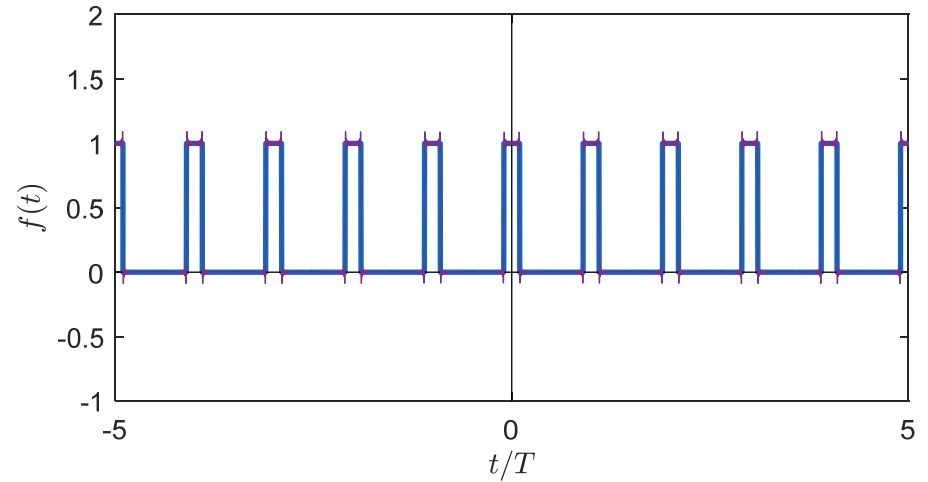


Example Matlab Calculation

$$f = 100 \text{ Hz}$$

$$T = 10 \text{ ms}$$

$$\tau = 2 \text{ ms}$$

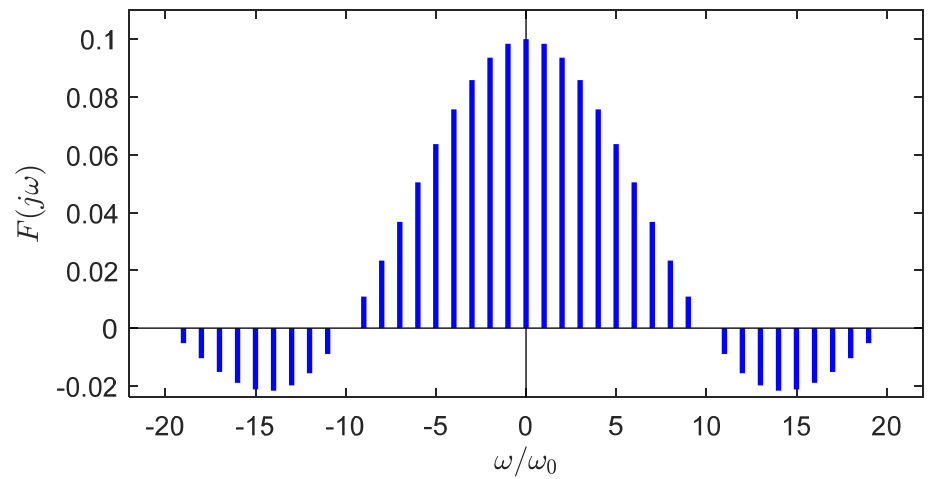
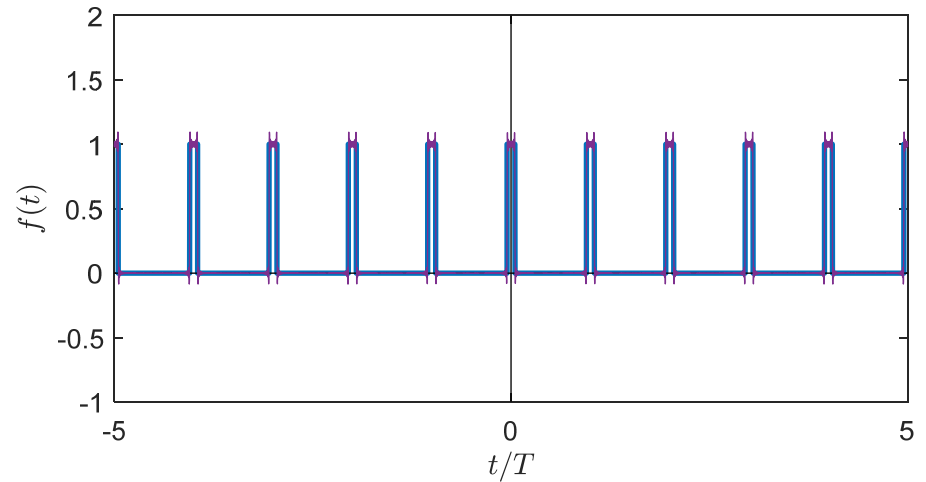


Example Matlab Calculation

$$f = 50 \text{ Hz}$$

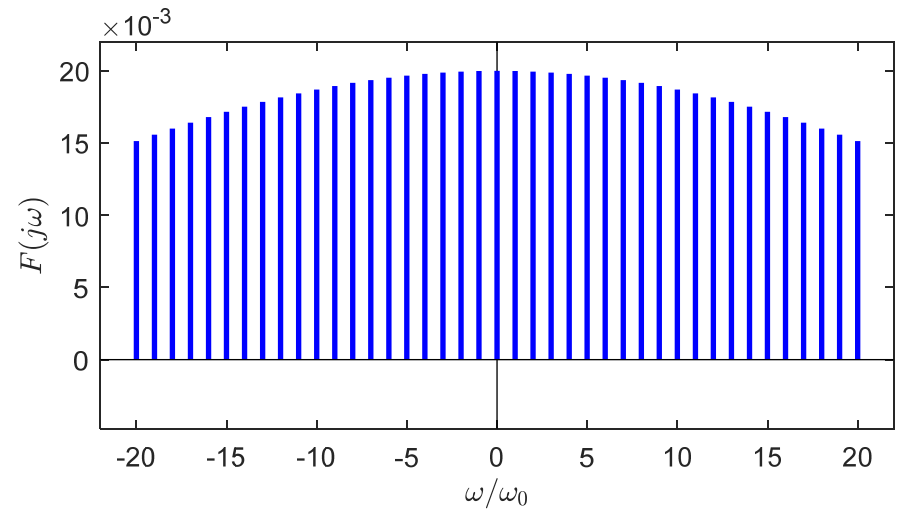
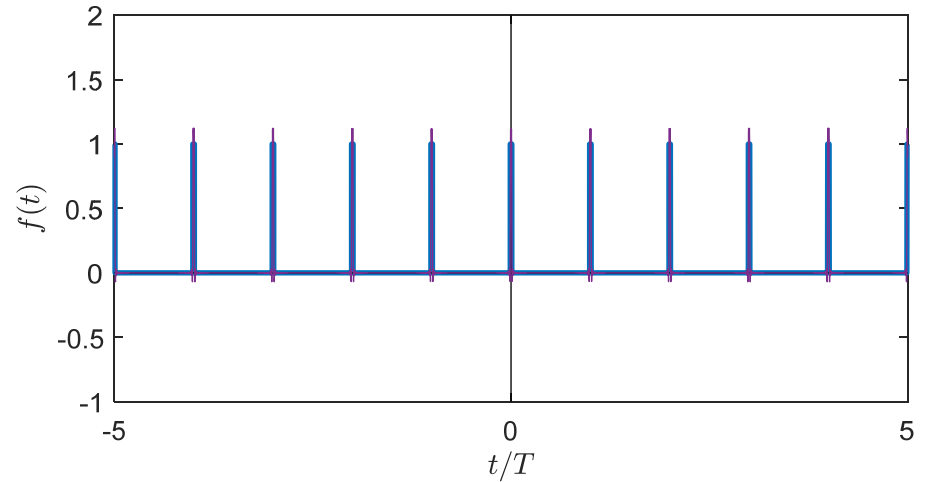
$$T = 20 \text{ ms}$$

$$\tau = 2 \text{ ms}$$



Example Matlab Calculation

$f = 10 \text{ Hz}$
 $T = 100 \text{ ms}$
 $\tau = 2 \text{ ms}$

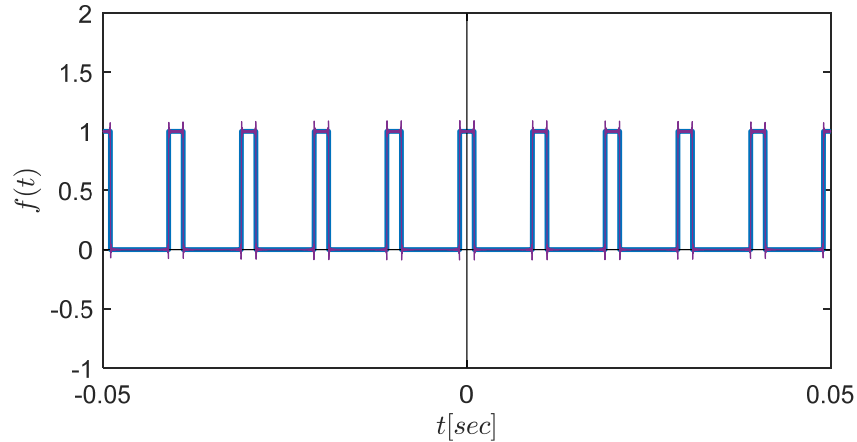


Alternate View

$f = 100 \text{ Hz}$

$T = 10 \text{ ms}$

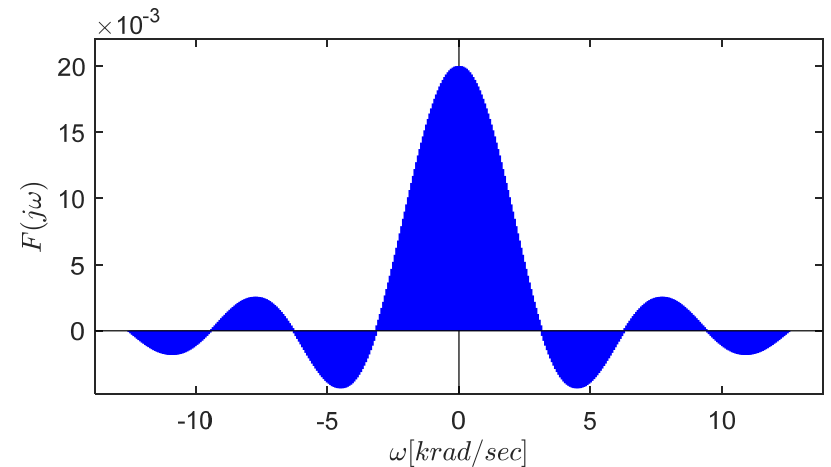
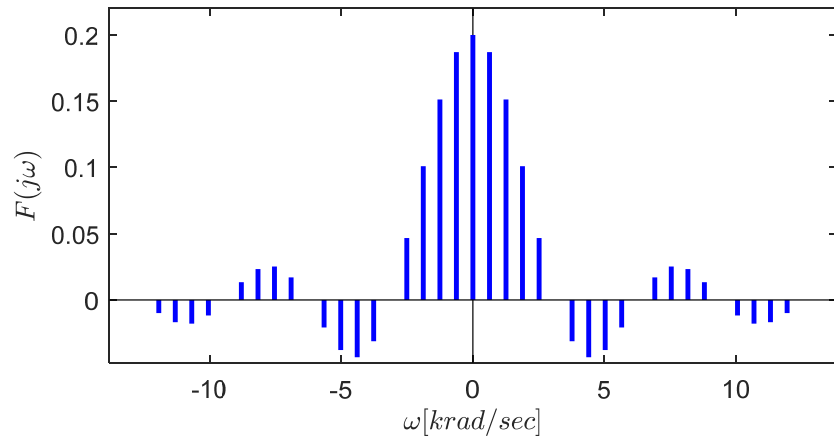
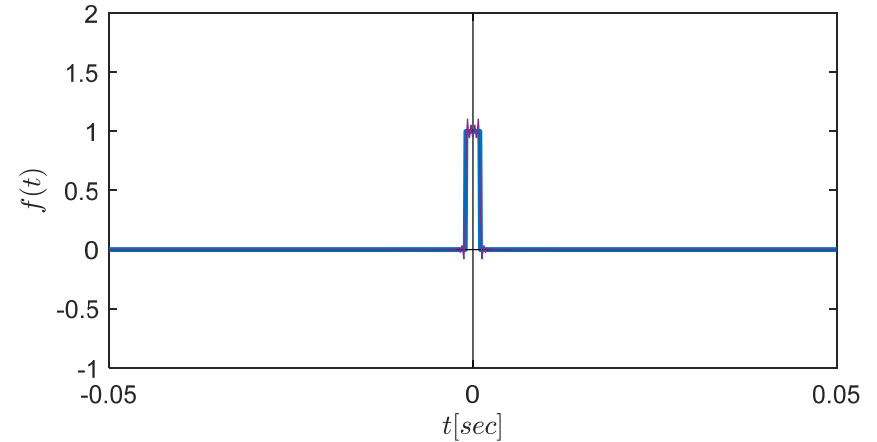
$\tau = 2 \text{ ms}$



$f = 10 \text{ Hz}$

$T = 100 \text{ ms}$

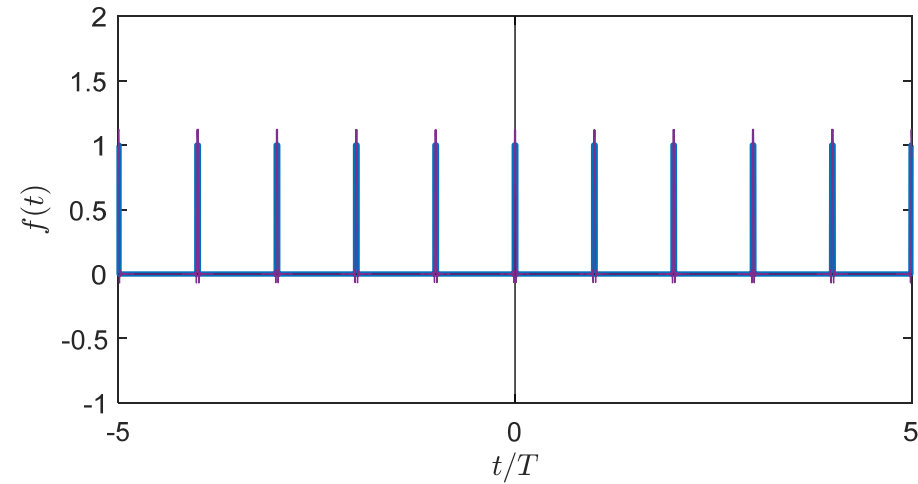
$\tau = 2 \text{ ms}$



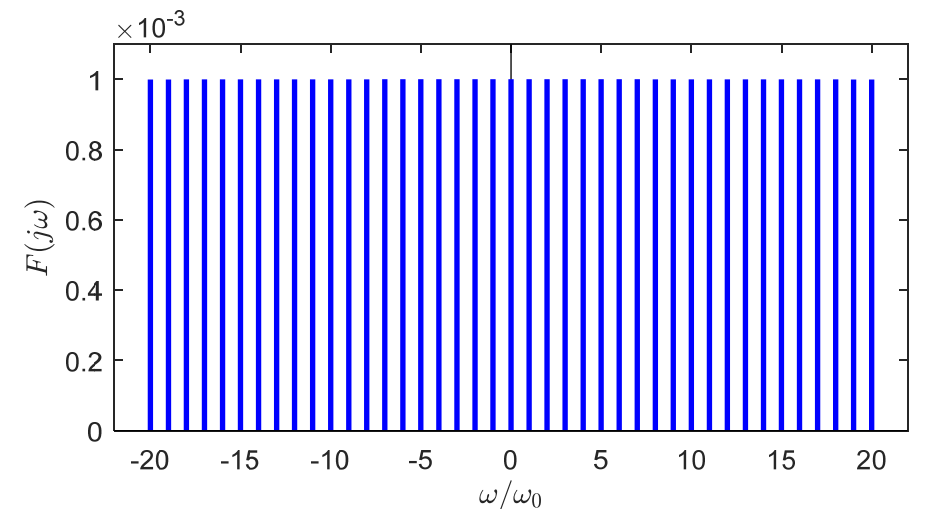
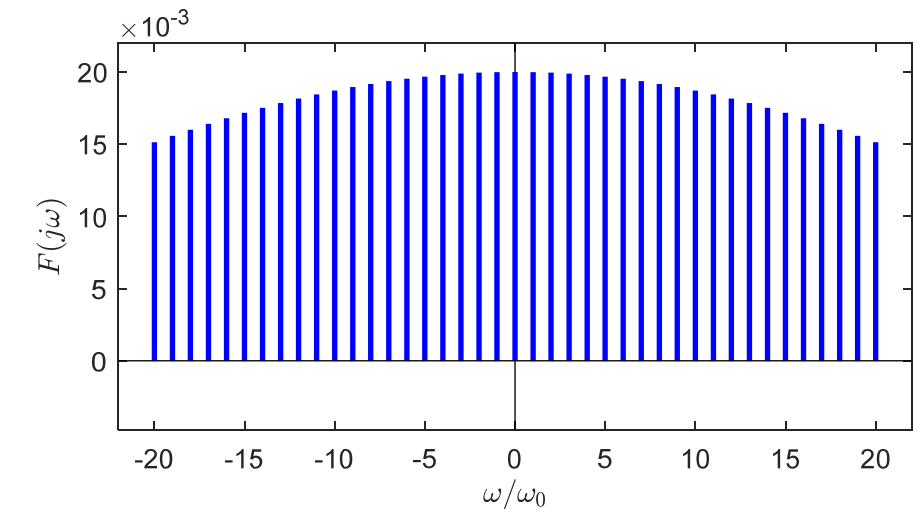
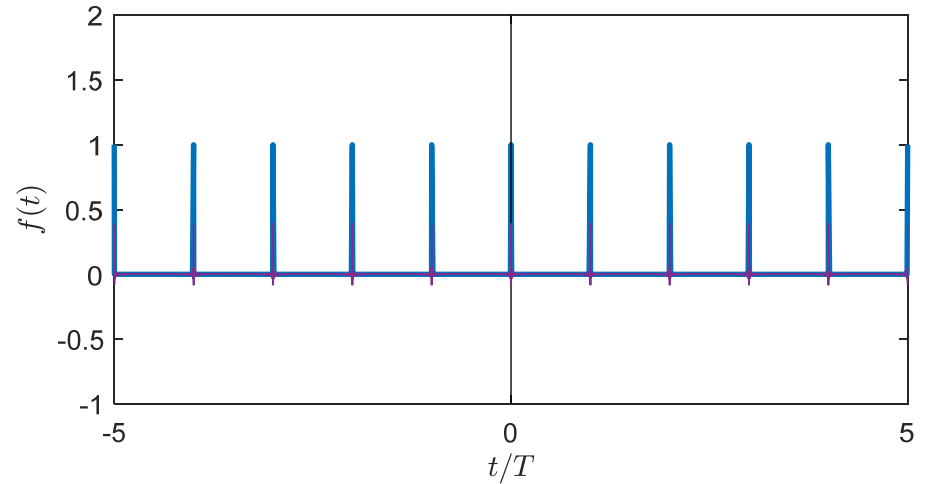
Non-periodic Waveforms: Fourier Transform

Fourier Series of Impulse Train

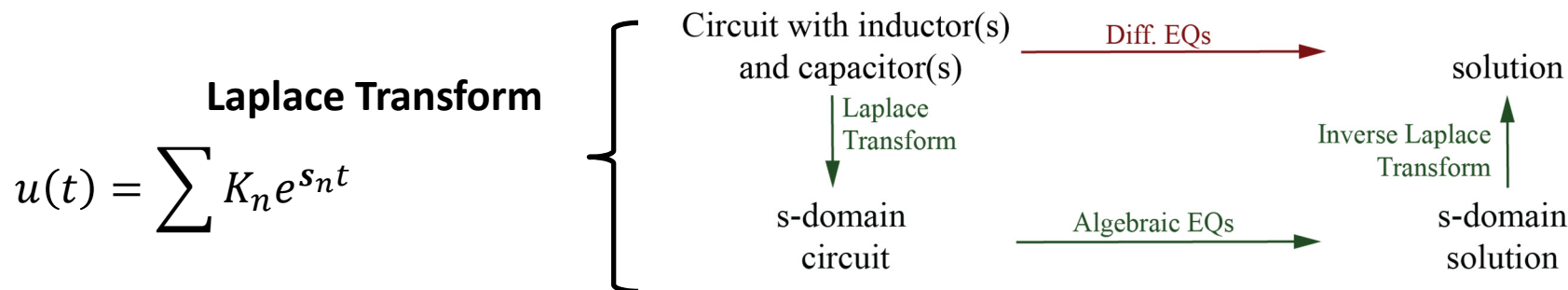
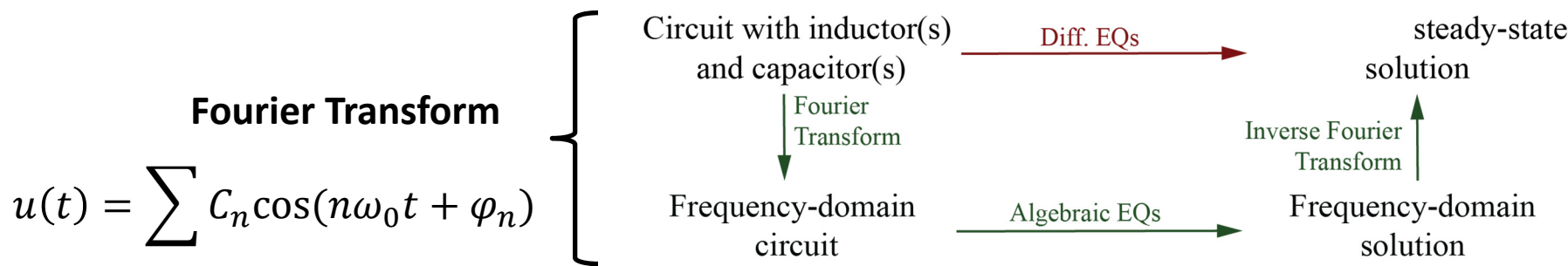
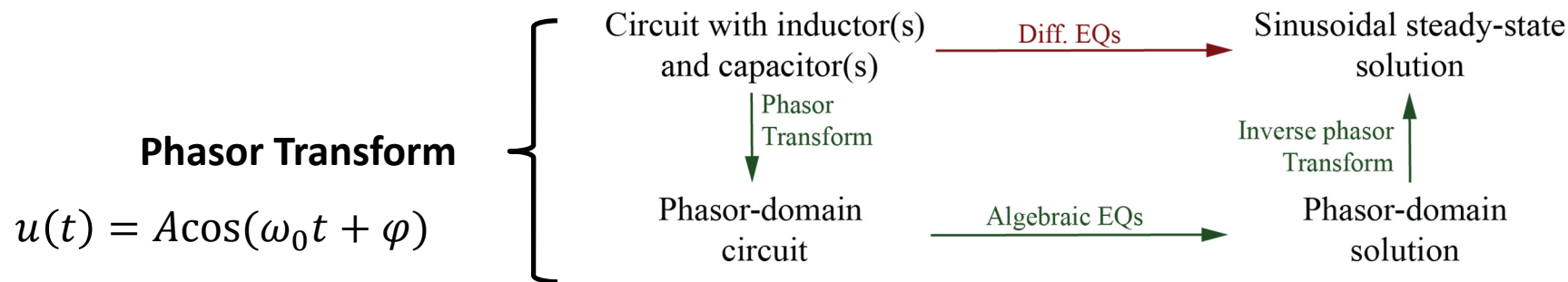
$f = 10$ Hz
 $T = 100$ ms
 $\tau = 2$ ms



$f = 1000$ Hz
 $T = 1$ ms
 $\tau = .02$ ms



Transform Domains



The Laplace Transform

Complex Frequency