

## 1    **Fourier Series**

1. Derive the Fourier Series coefficients  $b_n$  for an odd function.

2. Find the Fourier Series expression for the simple sawtooth wave defined by:

$$f(x) = \begin{cases} x + 1 & \text{if } -\pi \leq x \leq \pi \\ f(x + 2\pi) & \text{for all } x \end{cases}$$

## 2    Fourier Transform

1. Perform the Fourier Transform on the pulse defined by:

$$f(x) = \begin{cases} \cos(x) & \text{if } -\frac{\pi}{2} \leq x \leq \frac{\pi}{2} \\ 0 & \text{otherwise} \end{cases}$$

2. Find  $f$  as a function of  $t$  if, as a function of frequency,

$$\hat{f}(\xi) = \begin{cases} 1 & \text{if } -\frac{1}{2} \leq x \leq \frac{1}{2} \\ 0 & \text{otherwise} \end{cases}$$