

1. Define the function $\chi_{\pi/4}$ on $[-\pi, \pi]$ by

$$\chi_{\pi/4}(t) = \begin{cases} 1 & \text{if } |t| < \pi/4 \\ 0 & \text{if } |t| \geq \pi/4 \end{cases}$$

- (a) Compute the complex Fourier series of $\chi_{\pi/4}$.
 - (b) Compute the complex Fourier series of $\chi_{\pi/4}$ in orthonormal form.
2. Let $f(t) = t$ on $[-\pi, \pi]$.
 - (a) Compute the complex Fourier series of f .
 - (b) Compute the complex Fourier series of f in orthonormal form.