

EE206 Assignment 9 *

Due 12th Dec.

1. Find the Fourier integral representation of the given function

(a)

$$f(x) = \begin{cases} 0, & x < 0 \\ \sin x, & 0 \leq x \leq \pi \\ 0, & x > \pi \end{cases}$$

(b)

$$f(x) = \begin{cases} 0, & x < \pi \\ 3, & \pi < x < 2\pi \\ 0, & x > 2\pi \end{cases}$$

(c)

$$f(x) = \begin{cases} \frac{2}{3}x, & |x| < \pi \\ 0, & |x| > \pi \end{cases}$$

2. Find the cosine and sine integral representations of the given function

$$f(x) = e^{-x/2}, \quad x > 0$$

3. Find the Fourier transforms of the following function

(a)

$$f(x) = \begin{cases} 0, & x < -1 \\ e^{2ix}, & -1 < x < 1 \\ 0, & x > 1 \end{cases}$$

(b)

$$f(x) = e^{-|x|}$$

(c)

$$f(x) = \begin{cases} 0, & x < -1 \\ x, & -1 < x < 1 \\ 0, & x > 1 \end{cases}$$

*EE 206 differential equation and transform methods, Siyuan Zhan PhD, Maynooth University