

# Chapter 10

1. Find the Fourier series for the given function

$$(a) f(x) = \begin{cases} x, & -\pi \leq x < 0 \\ 0, & 0 \leq x < \pi \end{cases}, \quad f(x+2\pi) = f(x)$$

$$(b) f(x) = \begin{cases} 0, & -2 \leq x \leq -1 \\ x, & -1 < x < 1 \\ 0, & 1 < x < 2 \end{cases}; \quad f(x+4) = -f(x)$$

$$(c) f(x) = \begin{cases} x+2, & -2 \leq x < 0 \\ 2-2x, & 0 \leq x < 2 \end{cases}; \quad f(x+4) = f(x)$$

2. Find the values of the Fourier series at values  $x = -\frac{\pi}{2}, x = 0, x = \frac{\pi}{2}$  of (a)

3. Use method of separation of variables to solve

$$\begin{cases} u_t = u_{xx}, & 0 < x < 2\pi \\ u(x, 0) = \sin x - \sin 4x \\ u(0, t) = 0, u(2\pi, t) = 0 \end{cases}$$

4. Solve

$$\begin{cases} u_t = u_{xx}, & 0 < x < \pi \\ u(x, 0) = \cos 2x, u_t(x, 0) = \cos^2 x \\ u_x(0, t) = 0, u_x(\pi, t) = 0 \end{cases}$$

5. Solve

$$\begin{cases} u_t = u_{xx}, & 0 < x < \pi \\ u(x, 0) = \sin^2 x \\ u(0, t) = 0, u(\pi, t) = 0 \end{cases}$$