Sardar Vallabhbhai Patel Institute of Technology, Vasad
B. E. First Sem (Mathematics 1)

Tutorial-8

1. Express $f(x) = \frac{(\pi - x)}{2}$ as a Fourier series with period 2π to be valid in the interval 0 to 2π. Hence prove that $1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + ------ = \frac{\pi}{4}$.

2. Find the fourier series for the function f(x) given by

$$f(x) = \begin{cases} 1 + \frac{2x}{\pi} & ; \ -\pi \le x \le 0 \\ 1 - \frac{2x}{\pi} & ; \ 0 \le x \le \pi \end{cases}$$

3. Find a Fourier series with period 3 to represent $f(x) = 2x - x^2$ in the range (0, 3).

4. (i) Find the Fourier sine series of $f(x) = \pi - x, (0 < x < \pi)$.

   (ii) Find the Fourier cosine series for $f(x) = x^2, (0 < x < c)$.

5. Find the Fourier series to represent $f(x) = x^2 - 2$ when $-2 < x < 2$.

6. Find the Fourier series expansion for $f(x) = x - x^3$ in the interval $-1 < x < 1$.