

SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution) Coimbatore-641035.

UNIT-IV FOURIER SERIES AND FOURIER TRANSFORM FOURIER SERIES-ODD AND EVEN FUNCTIONS (-L,L) perbiens on (-l, l)J. Find the poweren serves of $b(\pi) = [l-\pi, 0 \le \pi \le 2]$ Boln: : NOW, $g(x) = \begin{cases} \phi_1(x), -l \le x \le 0 \\ \phi_2(x), 0 \le x \le l \end{cases}$ ゆいいい= リナン う ゆき (い)= リーン Now $\phi_1(-\infty) = l - \infty = \phi_2(\infty)$ $\Rightarrow g(x) \quad \text{is even} \Rightarrow b_0 = 0$ $a_0 = \frac{2}{3} \int_{3}^{3} g(x) \, dx = \frac{2}{3} \int_{3}^{3} (2-x) \, dx$ $= \frac{2}{\sqrt{2}} \int \frac{(\lambda - 2t)^2}{\sqrt{2}} \int \frac{1}{\sqrt{2}} dt$ $f = \frac{1}{2} \left[-\frac{1}{2} - \frac{1}{2} \right] = \frac{1}{2}$ $\alpha_0 = \ell$ $\alpha_n = \frac{2}{\ell} \int_{\ell}^{\ell} f(n) \cos \frac{n\pi \times d\pi}{d}$ $= \frac{2}{\ell} \int (\ell - \pi) \cos \frac{\pi \pi \pi}{2} d\pi \int u v d\pi = u v_1 - u^1 v_2 + \cdots$ $= \frac{2}{2} \left[(2-\chi) \frac{\sqrt{2}}{\sqrt{2}} \left(\frac{2}{\sqrt{2}} \right) - (-1) \frac{2^2}{\sqrt{2}} \left(-\frac{2}{\sqrt{2}} \right) \right]$ $= \frac{2}{0} \left[(2-\chi) \frac{2}{2\pi} \frac{2}{2\pi} \frac{2\pi}{2} \frac{2\pi}{2} - \frac{2\pi}{2\pi} \frac{2\pi}{2} \cos \frac{2\pi\pi}{2} \right]^{2}$ $=\frac{2}{2}\left[\frac{-2^{2}}{h^{2}\pi^{2}}\left(-1\right)^{n}+\frac{2^{2}}{h^{2}\pi^{2}}\right]=\frac{2}{2}\frac{2^{2}}{h^{2}\pi^{2}}\left[1-(-1)^{n}\right]$ $= \frac{2l}{n^2 \pi^2} \begin{bmatrix} 1 - (-1)^n \end{bmatrix}$ $a_n = \begin{bmatrix} H^2/n^2 \pi^2, & H n & \text{de odd} \\ 0, & H n & \text{de even} \end{bmatrix}$



SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution) Coimbatore-641035.

UNIT-IV FOURIER SERIES AND FOURIER TRANSFORM

FOURIER SERIES-ODD AND EVEN FUNCTIONS (-L,L)

