



(a)
$$= 2 + n = 1 \text{ for the fourier series } f(x) = x & \text{ for } (-\pi, \pi)$$

 $f(x) = x$
 $f(-x) = -x = -f(x)$
 $\therefore f(-x) = -f(x)$
 $\therefore f(x) \text{ is odd function}$
 $\therefore a_0 = 0 \text{ and } a_1 = 0.$
The fourier series is quien by
 $f(x) = \sum_{n=1}^{\infty} b_n \sin x.$



SNS COLLEGE OF TECHNOLOGY (AN AUTONOMOUS INSTITUTION) COIMBATORE - 35 DEPARTMENT OF MATHEMATICS



$b_n = \frac{1}{\pi} \int_{-\pi}^{\pi}$	x sinnx dx		'nılı	but of
= 1	= Jx sinnxdx	[·· x sina	ોક અ	en to
しこっと	V= son me	×		
U'= 1	$V_1 = -\frac{\cos nx}{n}$. \		
u"=0	$V_2 = -\frac{sinn}{n^2}$	<u>x</u>		
	$= \int -\alpha \frac{\cos n\alpha}{n} - L $			
=	$\frac{2}{\pi} \left[-\pi \frac{\cos n\pi}{n} + \right]$	SUNT -0	+0]	
=	응 [-전 (-1) ⁿ]			
	= -2 (-1)		~ 6	6. L. 4
-'. f(x)	$= \sum_{n=1}^{\infty} (-1)^n s^n$)nx.		



SNS COLLEGE OF TECHNOLOGY (AN AUTONOMOUS INSTITUTION) COIMBATORE - 35 DEPARTMENT OF MATHEMATICS



Find the Fousier series for
* f(x)= JL+x , -L <x20< td=""></x20<>
$\phi_1(x) = L + \infty$
$\phi_1(-\infty) = L - \infty = \phi_2(\infty)$
$\varphi_2(x) = L - x$
$\phi_{01}(-\infty) = L + \infty = \phi_1(\infty)$
-: f(x) is even function.
: The fouguer series is
$y(x) = \frac{\alpha_0}{2} + \frac{\varepsilon}{2} \alpha_1 \cos\left(\frac{n\pi x}{L}\right)$
$a_0 = \frac{1}{L} \int f(x) dx = \frac{2}{L} \int f(x) dx$
$= \frac{2}{L} \int (L-x) dx$
$= \underbrace{2} \begin{bmatrix} Lx - \underbrace{x^2}_2 \end{bmatrix}_0^L = \underbrace{2} \begin{bmatrix} L^2 - \underbrace{L^2}_2 \end{bmatrix}$
= 은 [블] = L
$a_0 = L$
$a_n = \int_{-L}^{L} \int_{-L}^{L} f(x) \cos\left(\frac{n\pi\alpha}{L}\right) dx$
$= \frac{2}{L} \int f(x) \cos\left(\frac{n\pi x}{L}\right) dx$
$= \underset{L}{\overset{P}{=}} \int_{1}^{1} (1-z) \cos\left(\frac{n\pi z}{L}\right) dx$





U=L-x	$V = cos(\frac{h\pi x}{L})$
u' = -1 $u'' = 0$	$V_1 = \frac{88n(n\pi\alpha/L)}{(n\pi/L)}$
	$V_2 = -\cos\left(\frac{n\pi x}{L}\right)$
= <u>2</u> L	$ (L-x) \underbrace{s^{\alpha} \left(\frac{Mx}{L} \right)}_{\frac{\Omega K}{L}} - (-1) \underbrace{ \left(-\frac{L}{L} \right)}_{\frac{M^2 \pi^2}{L^2}} $
= <u>2</u> L	$\begin{bmatrix} 0 - \frac{108(n\pi L)}{n^2\pi^2} - 0 + \frac{n^2\pi^2}{L^2} \end{bmatrix}$
= 212	$\frac{L^2}{X^2n^2} \left[1 - \cos nX \right]$
$=\frac{\alpha}{n^2}$	$\frac{1}{\pi^2} \left[-(-1)^2 + 1 \right]$
:. +(x)= -2	+ $\sum_{n=1}^{\infty} \frac{2L}{n^2 \pi^2} \left[1 - (-1)^n \right] \cos\left(\frac{n\pi\pi}{L}\right)$
= 1	$+\frac{2L}{\pi^2}\sum_{n=1}^{\infty}\frac{1(1-(-1)^n)}{n}\cos(\frac{n\pi\alpha}{L})$