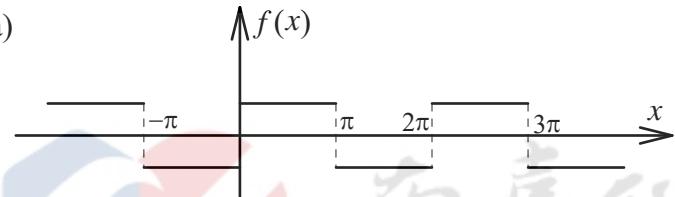


(a)畫出週期函數 $f(x) = \begin{cases} 1, & 0 < x < \pi \\ -1, & \pi < x < 2\pi \end{cases}$ 且 $f(x+2\pi)=f(x)$ 的圖形。(b)請問 $f(x)$ 是奇函數、偶函數，還是非奇、非偶函數？(c)求 $f(x)$ 的傅立葉級數。[103逢甲光電3]

[解](a)



(b)奇函數

$$(c) f(x) = \sum_{n=1}^{\infty} b_n \sin nx$$

$$b_n = \frac{2}{\pi} \int_0^\pi 1 \cdot \sin nx dx = -\frac{2}{\pi} \cdot \left(\frac{\cos nx}{n} \right) \Big|_0^\pi = -\frac{2}{\pi} \cdot \frac{\cos n\pi - 1}{n} = -\frac{2}{\pi} \cdot \frac{(-1)^n - 1}{n} = \frac{4}{(2n-1)\pi}$$

$$f(x) = \frac{4}{\pi} \sum_{n=1}^{\infty} \frac{1}{2n-1} \sin((2n-1)x)$$