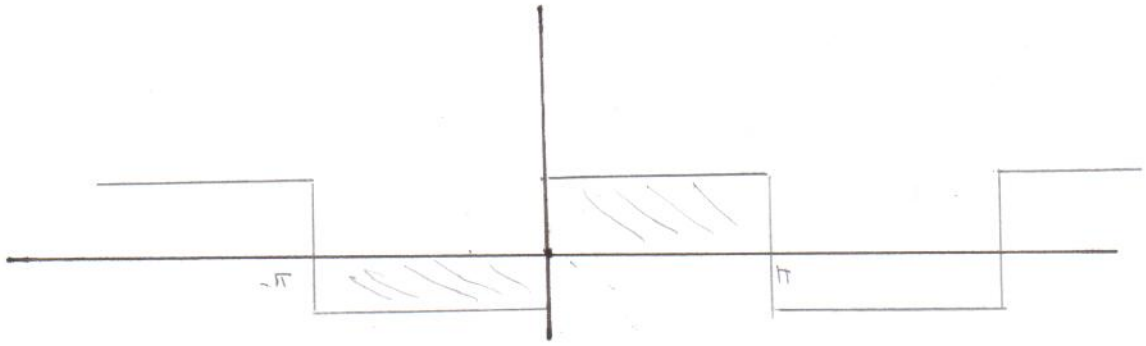

$$x(t) = \begin{cases} -1 & -\pi < t < 0 \\ 1 & 0 \le t \le \pi \end{cases} \qquad T = 2\pi$$

$$X_k = \frac{1}{2\pi} \int_{-\pi}^{\pi} x(t)\, e^{-2\pi j \frac{k}{2\pi} t}\, dt$$

$$X_k = \frac{1}{2\pi} \int_{-\pi}^{0} -e^{-jkt}\, dt + \frac{1}{2\pi} \int_{0}^{\pi} e^{-jkt}\, dt$$

$$X_k = \frac{1}{2\pi jk} \left[e^{-jkt} \right]_{-\pi}^{0} - \frac{1}{2\pi jk} \left[e^{-jkt} \right]_{0}^{\pi}$$

$$X_k = \frac{1 - e^{jk\pi} - e^{-jk\pi} + 1}{2\pi jk} = \frac{1 - (-1)^k}{\pi jk}$$

$$X_k = \begin{cases} 0 & k \text{ pair} \\ \frac{2}{\pi jk} & k \text{ impair} \end{cases} \qquad X_{-k} = -\frac{2}{\pi jk}$$

$$a_k = X_k + X_{-k} = 0 \qquad X_0 = 0$$

$$b_k = j\,(X_k - X_{-k}) = \frac{4}{\pi k}$$

$$x(t) = \frac{4}{\pi} \left(\frac{\sin t}{1} + \frac{\sin 3t}{3} + \frac{\sin 5t}{5} + \dots + \frac{\sin (2p+1)t}{2p+1} + \dots \right)$$