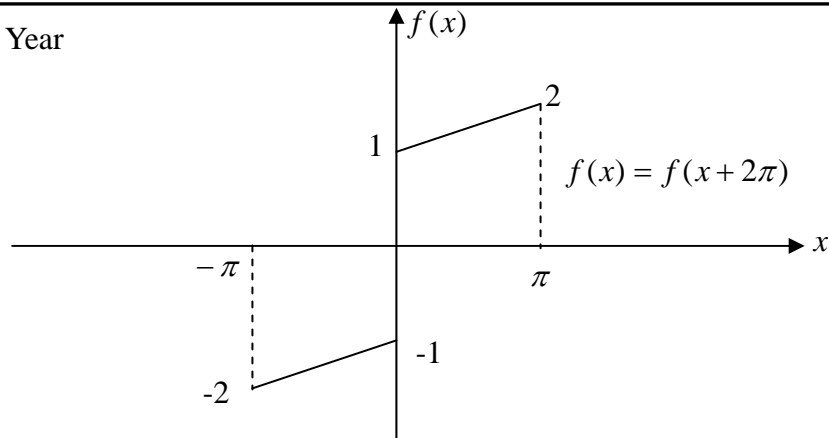


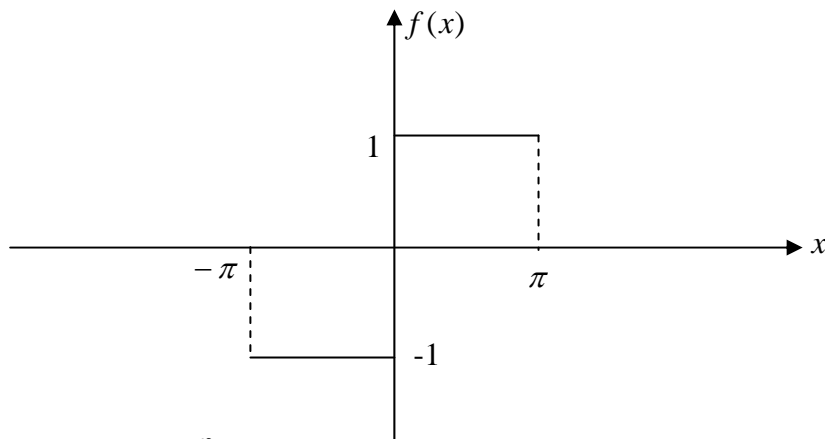
國立台灣海洋大學河海工程學系 2004 工程數學 (三) 第七次作業

1. Happy New Year



- (1) Express $f(x)$ by using Fourier series.
- (2) Express $f'(x)$ by using Fourier series.(termwise differentiation)
- (3) Express $f'(x)$ by using Fourier series.(adding the lost terms)
- (4) Express $f'(x)$ by using Fourier series.(Cesaro sum)

2.



(1) Express $f(x) = a_0 + \sum_{n=1}^{\infty} a_n \cos(nx) + b_n \sin(nx)$ where $f(x) = f(x + 2\pi)$.

(2) Express $f(x) = \frac{1}{2\pi} \int_{-\infty}^{\infty} F(\omega) e^{i\omega x} d\omega$ where $f(x) = \begin{cases} 1, & 0 < x < \pi \\ -1, & -\pi < x < 0 \\ 0, & \text{otherwise} \end{cases}$

$$F(\omega) = \int_{-\infty}^{\infty} f(x) e^{-i\omega x} dx .$$

