

**MATHEMATICS FOR AERO/MECHANICAL ENGINEERS****TUTORIAL SHEET 7****FOURIER SERIES**

1. Find the Fourier expansion of the following functions

(a)

$$f(t) = \begin{cases} -t & -\pi < t < 0 \\ 0 & 0 < t < \pi \end{cases}$$

$$f(t + 2\pi) = f(t)$$

(b)

$$f(t) = \frac{1}{2}t \quad 0 < t < 2\pi$$

$$f(t + 2\pi) = f(t)$$

(c)

$$f(t) = \begin{cases} 0 & -\pi < t < \frac{-\pi}{2} \\ 4 & \frac{-\pi}{2} < t < \frac{\pi}{2} \\ 0 & \frac{\pi}{2} < t < \pi \end{cases}$$

(d)

$$f(t) = \begin{cases} 0 & -5 < t < 0 \\ 1 & 0 < t < 5 \end{cases}$$

Period 10

$$f(t + 10) = f(t)$$

(e)

$$f(t) = \begin{cases} 2t & 0 < t < 1 \\ 2 & 1 < t < 2 \end{cases}$$

Period 2

$$f(t + 2) = f(t)$$