

## ECE355: Signals and Systems

### Homework #4

Due day: 4/05/2024

1. Find the trigonometric Fourier series for the function  $f(t) = t^2$  over the interval  $(-1, 1)$ .

2. Find the compact Fourier series for the periodic signal  $x(t)$  shown in the figure4-1.

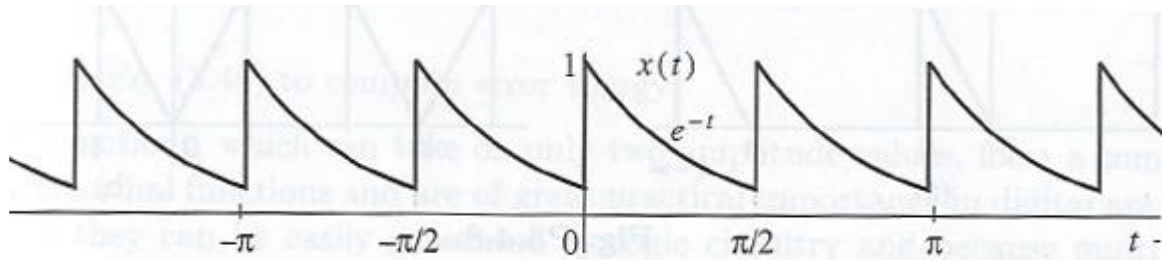


Figure 3-1

3. Find the exponential Fourier series for the periodic signal  $x(t)$  shown in the figure4-2.

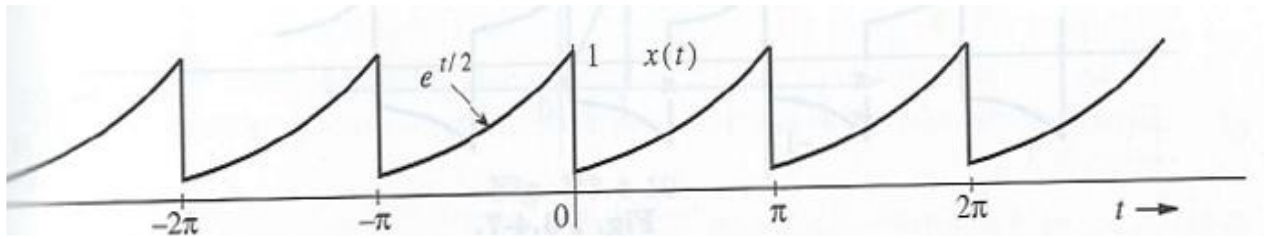


Figure 3-2

4. State, with reasons, whether the following single are periodic or aperiodic. For the periodic signals, find the period  $T$  and fundamental frequency  $\omega_0$  the

1)  $3\sin t + 2\sin 3t$

2)  $2\sin 3t + 7\sin \pi t$

3)  $3\sin \pi t + 5\sin 2\pi t$

4)  $(5\sin 2t)^3$