

# Assignment-1

Due date: 05/09/2019

*Assume suitable values wherever necessary*

Find the Fourier co-efficients and hence the Fourier series expansion. Check for convergence by plotting the series and the original function. Show the details of the work.

1.  $f(x) = x + \pi$  if  $-\pi < x < \pi$

2.  $f(x) = \sqrt{1 - \cos x}$  if  $-\pi < x < \pi$

3.  $f(x) = x \sin x$

4.  $f(x) = x \cos x$

5.  $f(x) = e^{-x}$  if  $0 < x < 2\pi$  and  $f(x + 2\pi) = f(x)$

6. Periodic function  $f(x) = \begin{cases} \pi x & \text{in } 0 \leq x \leq 1 \\ \pi(2 - x) & \text{in } 1 \leq x \leq 2 \end{cases}$

7. When a sinusoidal voltage  $V_0 \sin \omega t$  is passed through a half wave rectifier which clips the negative portion of the wave, the resulting periodic function is given by

$$v(t) = \begin{cases} 0 & \text{for } -\pi/\Omega < t < 0 \\ V_0 \sin \Omega t & \text{for } 0 < t < \pi/\Omega \end{cases}$$

Develop the function.