Engineering Mathematics-3

Assignment-4

Marks-15

1. Determine the Fourier transform of

$$f(t) = \begin{cases} 2K & |t| \leq 2, \\ 0 & |t| > 2 \end{cases}$$

and

$$g(t) = \begin{cases} K & |t| \leq 1, \\ 0 & |t| > 1. \end{cases}$$

Sketch the function $h(t) = f(t) - g(t)$ and determine its Fourier transform.

2. Obtain the Fourier transform of the windowed sine function

$$f(t) = \sin(2t)\left[H(t+1) - H(t-1)\right].$$

3*. The following values of $y = f(x)$ give the displacement in inches of a certain machine part for the rotation x of the flywheel. Write a MATLAB function to expand y in terms of a Fourier series upto four harmonics. Plot the graph of the same using MATLAB and record the output.

x	0	$\pi/6$	$2\pi/6$	$3\pi/6$	$4\pi/6$	$5\pi/6$	π
$y = f(x)$	0	9.2	14.4	17.8	17.3	11.7	0

and $f(x + \pi) = f(x)$

* Take a print of MATLAB code along with output and graph, then attach this sheet with the sheets in which you have answered first two questions.

Note: Submit assignment to the respective course leader on or before 19 November 2019.