Computer Assignment 3

Anish Turlapaty, IIIT Sri City

11-30 March 2019

Maximum Grade: 10

1 Analysis and Synthesis

For the given periodic signals with the period $T = 3$, compute the Fourier coefficients and then reconstruct the original signal.

For each of the signals, plot the following:

- The original and reconstructed signal on the same plot
- The Fourier coefficients; both the real and imaginary components vs the theoretical values.
- $$x(t) = t^2 \quad |t| < 1 \tag{1}$$
- $$x(t) = 1 - \frac{|t|}{3} \quad |t| < 1$$
- $$x(t) = cos(\pi t) \quad |t| < 1 \tag{2}$$

2 Convergence

For the three signals, demonstrate the convergence of the reconstructed signal with respect to the original signal.

3 Fourier Transform

For the given aperiodic signals, compute the Fourier transform and then the inverse Fourier Transform.

For each of the signals, plot the following:

- The original and reconstructed signal on the same plot

- The Fourier transform both the real and imaginary components vs the theoretical values.

- $$x(t) = t^3 \quad |t| < 1 \tag{3}$$

- $$x(t) = 1 - \frac{|t|}{2} \quad |t| < 1$$

- $$x(t) = sinc(t) \quad |t| < 2 * \pi \tag{4}$$