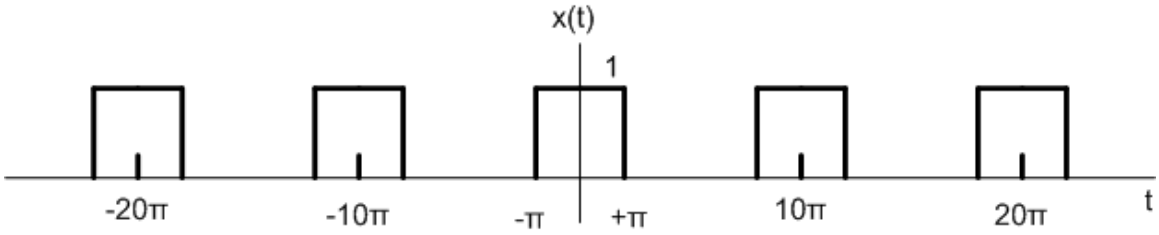
CSE 351 – Signals and Systems, Spring 2020
Homework # 3
Due: May 13, 2020
Doç. Dr. Hasari Çelebi

Problems:

1. [**40 points**] Consider the following periodic signal *x(t)* shown below.



   a. Find the compact trigonometric Fourier series and sketch the amplitude and phase spectra.
   b. Find the exponential Fourier series and sketch the corresponding spectra.

2. [**30 points**] Consider the following LTIC system:

   $(D^2+3D+2)y(t)=(D+3)f(t),$

   Find the zero-state response if the input *f(t)* is $e^{-3t}u(t)$ using Fourier Transform.

3. [**30 points**] A TV signal (video and audio) has a bandwidth of *4.5 MHz*. This signal is sampled, quantized, and binary-coded to obtain a PCM (pulse code modulated) signal.
   a. Determine the sampling rate if the signal is to be sampled at a rate 20% above the Nyquist rate.
   b. Determine the number of binary pulses required to encode each sample if the quantization level is 1024.
   c. Determine the binary pulse rate (bits/second) of the binary coded signal.