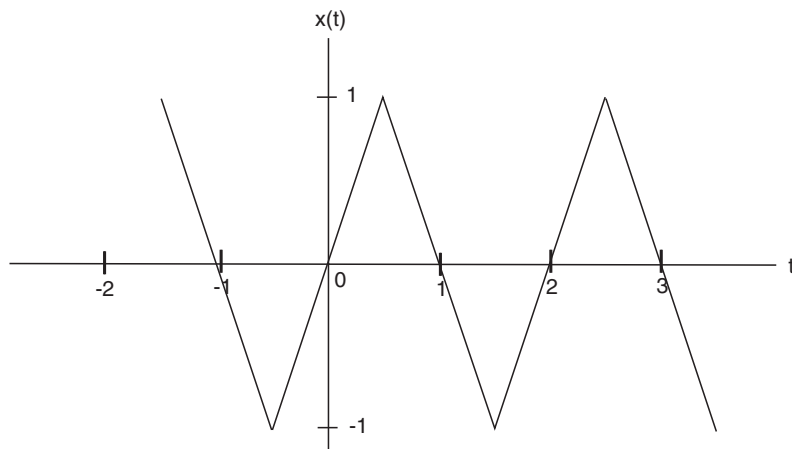
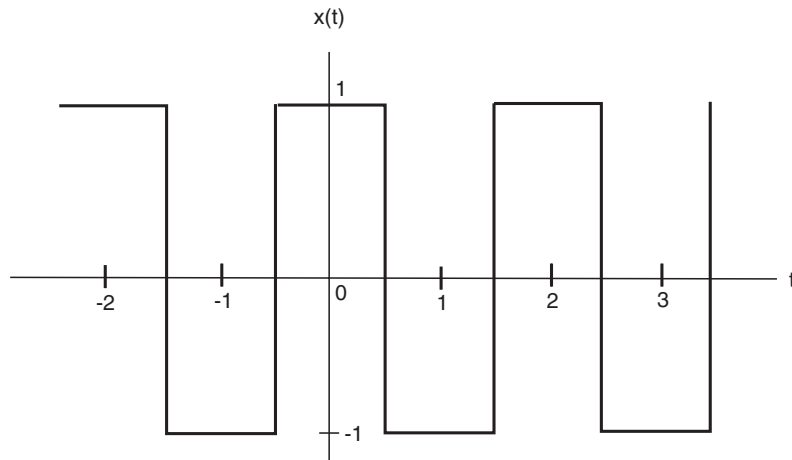


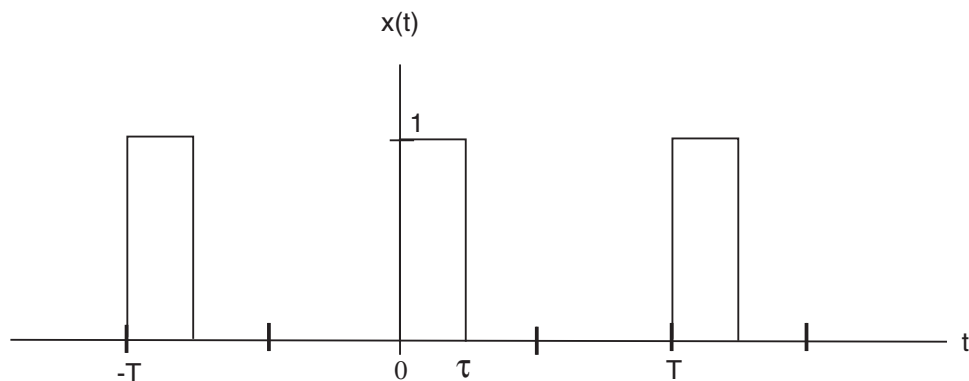
HW 2: Complex Form of the Fourier Series

1. Find the complex form of the Fourier Series of the following periodic signals:



2. Find the complex form of the Fourier Series for the following signal:

- (a) $\tau = 1, T = 10$.
- (b) $\tau = 1, T = 100$.



3. Modify the Matlab M-file “FS.m” and the other Matlab functions from Homework 1 so that they compute the complex form of the Fourier series. Use your program to check your hand-calculated results of problems 1, 2(a), and 2(b) up to $n = 20$. Note, the program “quad” works better if you set the limits of integration so that they do not contain any sudden discontinuities in $x(t)$, for example, if there is a discontinuity at t_1 use $quad(f, t_0, t_1 - 0.001, 1e - 10) + quad(f, t_1 + 0.001, t_2, 1e - 10)$ instead of $quad(f, t_0, t_2, 1e - 10)$. A complex exponential can be realized in Matlab using the “exp” function (type “help exp”). For each signal, submit your hand-calculated coefficients alongside the Matlab computed coefficients up to $n = 20$, a plot of the Fourier series approximation to the signal, and a plot of the magnitude of the coefficients (line spectrum).