1) (35 pts) Using Matlab, find the Exponential Fourier Series coefficients of the **square** signal x(t) shown in Fig. 1.

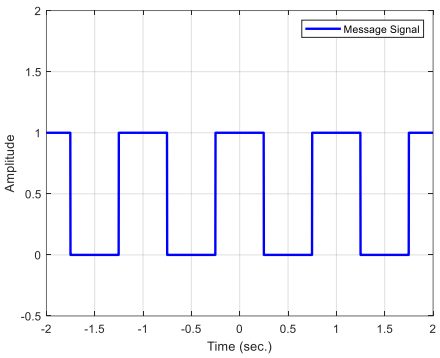

Figure 1 – Periodic Square Signal

a) (7 pts) Plot the first five of x(t) as a function of the frequency.
b) (7 pts) Plot the first harmonic approximation of x(t) and the original signal on top of each other as a function of time and comment on your results.
c) (7 pts) Plot the first three harmonics approximation of x(t) and the original signal on top of each other as a function of time and comment on your results.
d) (7 pts) Plot the first ten harmonics approximation of x(t) and the original signal on top of each other as a function of time and comment on your results.
e) (7 pts) In part (a), what happens when you change the fundamental frequency to 0.5 Hz? Comment on your results.

2) (35 pts) Using Matlab, find the Exponential Fourier Series coefficients of the **sawtooth** signal y(t) shown in Fig. 2.

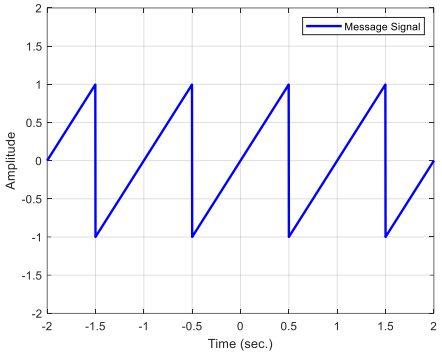

Figure 2 - Periodic Sawtooth Signal

a) (15 pts) Plot the first 10 harmonics of y(t) as a function of the frequency.
b) (20 pts) Plot the first harmonic approximation of y(t), first 3 harmonics approximation of y(t), and first 5 harmonics approximation of y(t), and the original signal on top of each other as a function of time and comment on your results.