Week 1 Homework
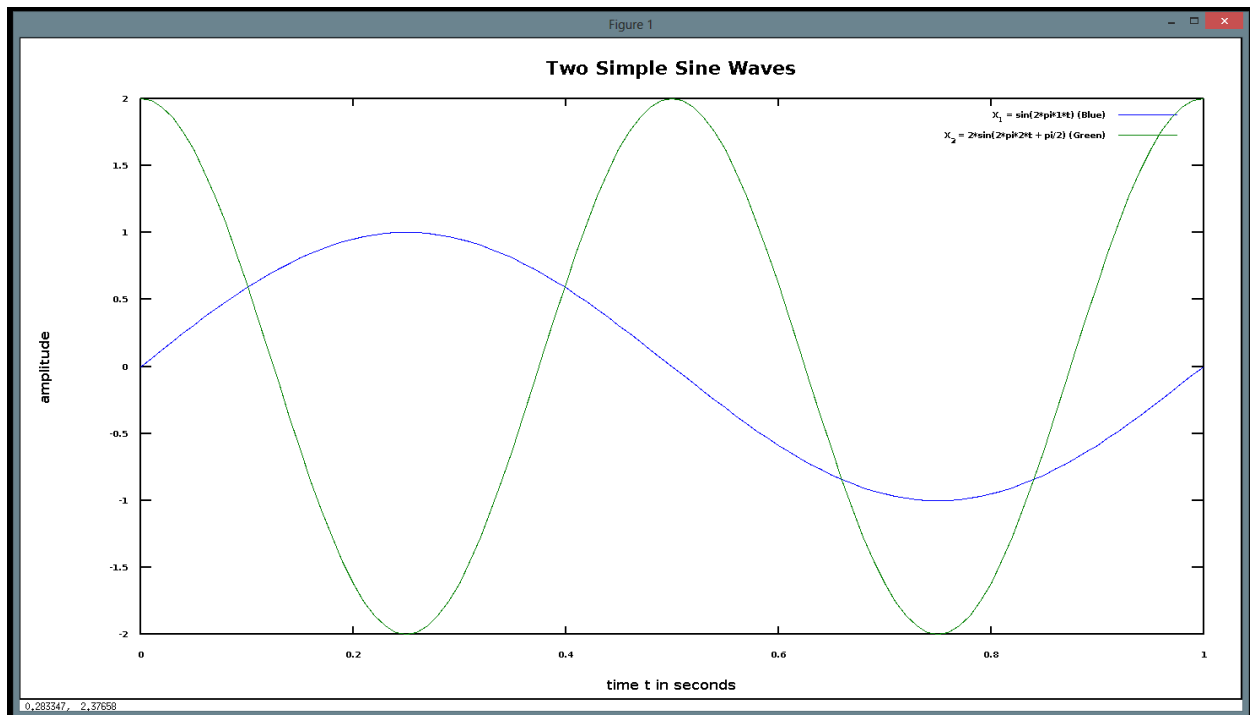John Lasheski
October 25, 2014

Part A.

Below is attached output from two sine waves.

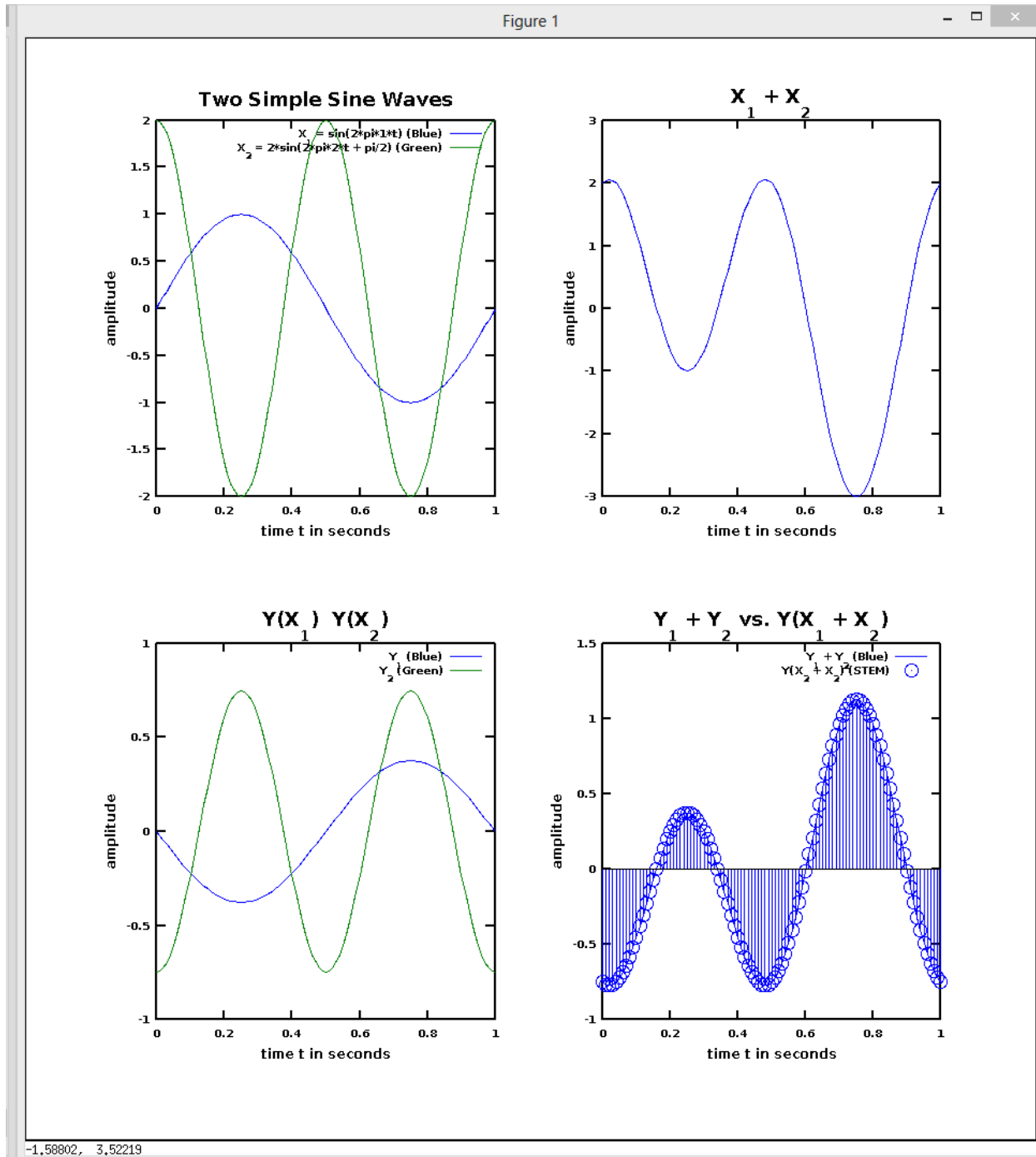$$X_1 = \sin(2\pi t),\, and\ X_2 = 2\sin\left(4\pi t + \frac{\pi}{2}\right)$$
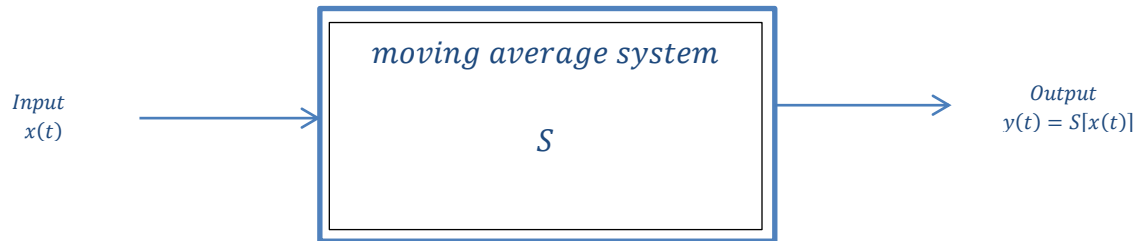
Part B.

The system Y is a linear system since $Y[X_1(t) + X_2(t)] = Y[X_1(t)] + Y[X_2(t)]$.

Example plots below.

Part C.

Block diagram for time invariant linear system that performs a 5 point moving average.

Below (on next page) is attached output from running the 5 point moving average on a triangle impulse wave and on the supplied data for5avg.m.

Figure 1

Triangle Impulse Wave with 5 Period Moving Average

Triangle Pulse t(n,7,1) (Blue)
Moving Average(t, 5) (Green)

time t in seconds

amplitude

Vector X with 5 Period Moving Average

X (Blue)
Moving Average(X, 5) (Green)

time t in seconds

amplitude

-0.116609, -0.529492