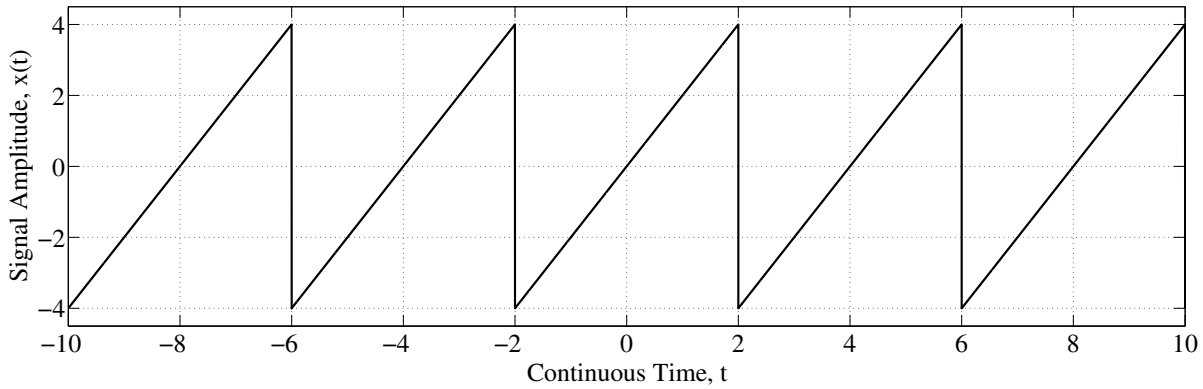
ELEC 309
Signals and Systems
Homework 5 Assignment

Frequency-Domain Analysis of Signals



1. For the periodic continuous-time signal $x(t)$ shown above:

   (a) Find the exponential Fourier series representation of $x(t)$.

   (b) Find the trigonometric Fourier series representation of $x(t)$.

   (c) Find the harmonic/compact Fourier series representation of $x(t)$.

   (d) Verify Parseval's theorem for $x(t)$, using the identity

   $$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}.$$

   (e) Using MATLAB, write a script m-file to plot the Fourier spectra for the signal. (Plot $|D_n|$ vs. ω and $\angle D_n$ vs. ω (where $\omega = n\omega_0$) on a single figure by using the *subplot* command.) Upload a copy of your MATLAB script m-file to the course website.