EE3210 Signals and Systems

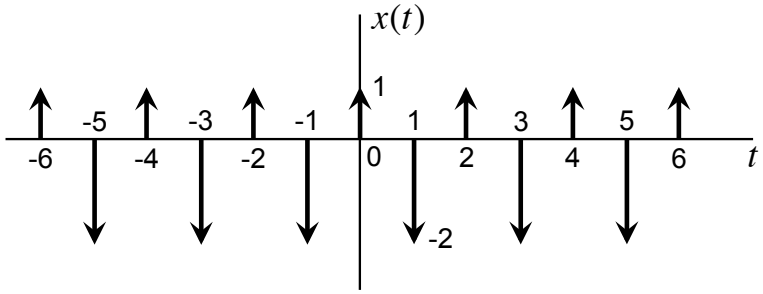
Tutorial 8

Problem 1: Let $x_1(t)$ be a continuous-time periodic signal with fundamental period T and Fourier series coefficients a_k. Consider

$$x_2(t) = x_1(1-t).$$

Find a relationship between the Fourier series coefficients b_k of $x_2(t)$ and the coefficients a_k of $x_1(t)$.

Problem 2: Determine the Fourier series coefficients of the following signal:



Problem 3: Consider the following three continuous-time signals:

$$x(t) = \cos(4\pi t)$$

$$y(t) = \sin(4\pi t)$$

$$z(t) = x(t)y(t)$$

(a) Determine the Fourier series coefficients of $x(t)$.

(b) Determine the Fourier series coefficients of $y(t)$.

(c) Use the results of parts (a) and (b), along with the multiplication property of the continuous-time Fourier series, to determine the Fourier series coefficients of $z(t)$.

(d) Determine the Fourier series coefficients of $z(t)$ through direct expansion of $z(t)$ in trigonometric form, and compare your result with that of part (c).