EE3210 Signals and Systems

Tutorial 7

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: Consider a continuous-time periodic signal $x(t)$ with period 3 and

$$x(t) = \begin{cases} 1, & -0.5 < t < 0.5 \\ 0, & 0.5 < t < 2.5. \end{cases}$$

Determine the Fourier series coefficients of the signal $2x(t-0.5) + x(t-1.5)$.

Problem 3: For Problem 1 in Tutorial 6, 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 $z(t)$.

Problem 4: Determine the Fourier series coefficients of a discrete-time periodic signal $x[n]$ shown in the following figure.