

Homework No. 4**Due 10:10 am, May 17, 2005**

3.50 Use the defining equation for the Fourier series coefficients to evaluate the Fourier series representation of the following signals:

(a) $x(t) = \sin(3\pi t) + \cos(4\pi t)$ (10%)

(b) $x(t) = \sum_{m=-\infty}^{\infty} \delta(t - m/3) + \delta(t - 2m/3)$ (10%)

3.51 Use the definition of the Fourier series to determine the time-domain signals represented by the following Fourier series coefficients:

(a) $X[k] = j\delta[k-1] - j\delta[k+1] + \delta[k-3] + \delta[k+3]$, $\omega_0 = 2\pi$ (10%)

(e) $X[k]$ as depicted in Figure P3.51(b) of the textbook, $\omega_0 = 2\pi$ (10%)

3.54 Use the defining equation for the Fourier transform to evaluate the frequency-domain representations of the following signals:

(a) $x(t) = e^{-2t}u(t-3)$ (10%)

(b) $x(t) = e^{-4|t|}$ (10%)

3.67 Find the frequency response and impulse response of the systems having the output $y(t)$ for the input $x(t)$:

(a) $x(t) = e^{-t}u(t)$, $y(t) = e^{-2t}u(t) + e^{-3t}u(t)$ (10%)

(c) $x(t) = e^{-2t}u(t)$, $y(t) = 2te^{-2t}u(t)$ (10%)

3.77 For the Fourier transform $X(\omega)$ shown in Figure P3.77 of the textbook,

evaluate the following quantities without explicitly computing $x(t)$:

(a) $\int_{-\infty}^{\infty} x(t) dt$ (4%) (d) $\arg\{x(t)\}$ (4%)

(b) $\int_{-\infty}^{\infty} |x(t)|^2 dt$ (4%) (e) $x(0)$ (4%)

(c) $\int_{-\infty}^{\infty} x(t)e^{j3t} dt$ (4%)