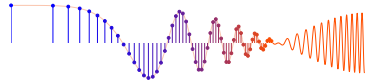

Example 11-11: Time-Delay Property

As an example of the use of this property, consider the signal

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

Although we have not seen this signal in exactly this form before, by a slight modification we can obtain a delayed and scaled version of a signal that is in Table 11-2. Note that an equivalent form is

$$x(t) = e^{-6}e^{-2(t-3)}u(t-3)$$

which shows that we have the signal $e^{-2t}u(t)$ delayed by 3 and multiplied by the constant e^{-6}. Therefore, we can apply the time-delay property and use the transform of the one-sided exponential (the first entry in Table 11-2) to obtain

$$X(j\omega) = \frac{e^{-6}e^{-j\omega 3}}{2 + j\omega} \tag{11.78}$$

as the Fourier transform of the original signal. ■

McClellan, Schafer and Yoder, *Signal Processing First,* ISBN 0-13-065562-7.
Prentice Hall, Upper Saddle River, NJ 07458.