Example 3-1: To determine the spectrum of the following signal,

$$x(t) = 10 + 14\cos(200\pi t - \pi/3) + 8\cos(500\pi t + \pi/2)$$

which is the sum of a constant and two sinusoids, we must convert from the general form in (**??**) to the two-sided form in (**??**). After we apply the inverse Euler formula, we get the following five terms:

$$\begin{aligned} x(t) = 10 &+ 7e^{-j\pi/3}e^{j2\pi(100)t} + 7e^{j\pi/3}e^{-j2\pi(100)t} \\ &+ 4e^{j\pi/2}e^{j2\pi(250)t} + 4e^{-j\pi/2}e^{-j2\pi(250)t} \end{aligned} \tag{3.1}$$

Note that the constant component of the signal, often called the ***DC component***, can be expressed as a complex exponential signal with zero frequency (i.e., $10e^{j0t} = 10$). Therefore, in the list form suggested in (**??**), the spectrum of this signal is the set of five rotating phasors represented by the frequency/complex amplitude pairs

$$\{(0,\ 10),\ (100,\ 7e^{-j\pi/3}),\ (-100,\ 7e^{j\pi/3}),\ (250,\ 4e^{j\pi/2}),\ (-250,\ 4e^{-j\pi/2})\}$$

Note: The terminology "DC" comes from electric circuits, where a constant value of current is called direct current, or DC. It is common to call $X_0 = A_0$ the DC component of the spectrum. Since the DC component is constant, its frequency is $f = 0$.