1.5.3 Find the phasor notation of $v(t) = \cos(120\pi t - 60^\circ) - \sin(120\pi t)$.

First, we rewrite the signal in terms of positive cosines with phase shifts.

$$v(t) = \cos(120\pi t - \frac{\pi}{3}) + \cos(120\pi t + \frac{\pi}{2})$$

Now we can convert this signal to phasor notation.

$$\begin{aligned} V(\chi) &= \cos(-\frac{\pi}{3}) + j\sin(-\frac{\pi}{3}) + \cos(\frac{\pi}{2}) + j\sin(\frac{\pi}{2}) \\ &= \frac{1}{2} - j\frac{\sqrt{3}}{2} + 0 + j \\ &= \frac{1}{2} + j(1 - \frac{\sqrt{3}}{2}) \end{aligned}$$