

PROBLEM:

A digital chirp signal is synthesized according to the following formula:

$$x[n] = \Re\{e^{j\theta[n]}\} = \cos(\pi(0.7 \times 10^{-3})n^2) \quad \text{for } n = 0, 1, 2, \dots, 200$$

- (a) Make a plot of the rotating phasor $e^{j\theta[n]}$ for $n = 10, 50$ and 100 .
- (b) If this signal is played out through a D-A converter whose sampling rate is 8 kHz, make a plot of the instantaneous analog frequency (in hertz) versus time for the analog signal.
- (c) If the *constant frequency* digital signal $v[n] = \cos(0.7\pi n)$ is played out through a D-A converter whose sampling rate is 8 kHz, what (analog) frequency will be heard?