

## PROBLEM:

Suppose that a discrete-time signal  $x[n]$  is given by the formula

$$x[n] = 10 \cos(0.25\pi n + \pi/2)$$

and that it was obtained by sampling a continuous-time signal at a sampling rate of  $f_s = 1000$  samples/second.

- Determine two *different* continuous-time signals  $x_1(t)$  and  $x_2(t)$  whose samples are equal to  $x[n]$ ; i.e., find  $x_1(t)$  and  $x_2(t)$  such that  $x[n] = x_1(nT_s) = x_2(nT_s)$  if  $T_s = 0.001$ . Both of these signals should have a frequency less than 1000 Hz. Give a formula for each signal.
- If  $x[n]$  is given by the equation above, what signal will be reconstructed by an ideal D-to-C converter operating at sampling rate 1000 samples/second?