

Exercises Week1

DSP

1. Are the following signals periodic? If yes, compute their period.

- a. $x[n] = \cos(\pi \frac{3}{10}n)$
- b. $x[n] = \cos(7.2\pi n)$
- c. $x[n] = \sin(3n)$
- d. $x[n] = \sin(\frac{\pi n}{2}) + \cos(\frac{3\pi n}{4})$

2. Consider the following signal:

$$x_a(t) = (1 + 0.5\cos(400\pi t)) \cdot \cos(8000\pi t)$$

- a. Compute the minimum sampling frequency necessary for avoiding alias
- b. The signal is sampled with 8000Hz. Write the discrete signal obtained via sampling.
- c. What is the analog signal reconstructed from the samples via ideal D/A reconstruction?