

1. (10 pts Total) Consider the periodic signal

$$x(t) = \sum_{k=-\infty}^{\infty} [u(t - 10k) - u(t - 10k - 3)].$$

- (a) (2 pts) Plot $x(t)$ and determine its period T_0 .
(b) (5 pts) Determine the Fourier Series coefficients of $x(t)$.
(c) (3 pts) Using the linearity property, determine the Fourier Series coefficients of

$$\tilde{x}(t) = 10 \left\{ \sum_{k=-\infty}^{\infty} [u(t - 10k) - u(t - 10k - 3)] \right\} - 3.$$

2. (10 pts Total) A discrete-time signal, $x[n]$, is periodic with period $N = 4$. For $0 \leq n \leq 3$, $x[n]$ is described by

$$x[n] = (n + 1), \quad n = 0, 1, 2, 3.$$

- (a) (5 pts) Determine the Fourier Series coefficients of $x[n]$.
(b) (5 pts) If $x[n]$ is passed through an LTI system with impulse response $h[n] = \delta[n] + \delta[n - 1]$, determine the system output $y[n]$. [Hint: Do the convolution sum directly.]