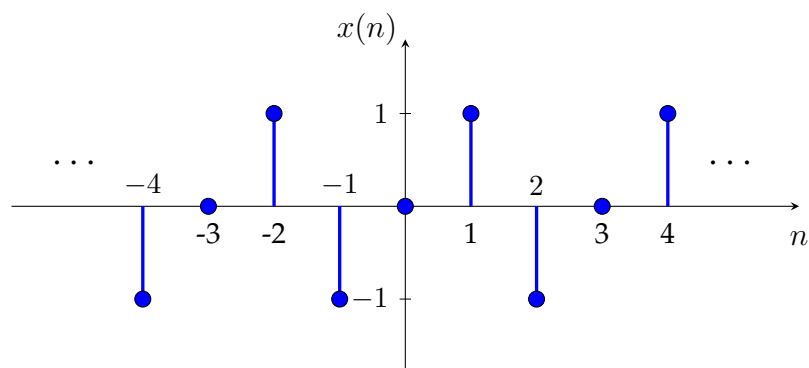


MT2.5 (Continued)

(b) (30 Points) Consider the discrete-time periodic signal shown below.



The signal has fundamental period $p = 3$.

(i) (15 Points) Determine all the DTFS coefficients X_k for the signal x .

FIRST Name:

LAST Name:

SID (All Digits):

MT2.5 (b) (Continued)

- (ii) (8 Points) Show that the signal x can be described by $x(n) = \alpha \sin(\beta n)$ for all integers n , and for some parameters α and β .

Determine α and β numerically. Your answers must be in the simplest form possible, but not expressed as decimals.

- (iii) (7 Points) Evaluate $\langle \mathbf{X}, \mathbf{X} \rangle$ where \mathbf{X} denotes the vector of all the DTFS coefficients.