

## PROBLEM:

Suppose that a system is defined by the following operator

$$H(z) = 1 - z^{-1}$$

- (a) Write the time-domain description of this system—in the form of a difference equation.
- (b) Determine the poles and zeros of  $H(z)$ .
- (c) A periodic signal  $x[n]$  with period  $M$  satisfies the condition:

$$x[n + M] = x[n] \quad \text{for all } n$$

Prove that when the input to this system is periodic with period  $M$ , that the output will also be periodic with the same period. Give a numerical example for  $M = 5$ .