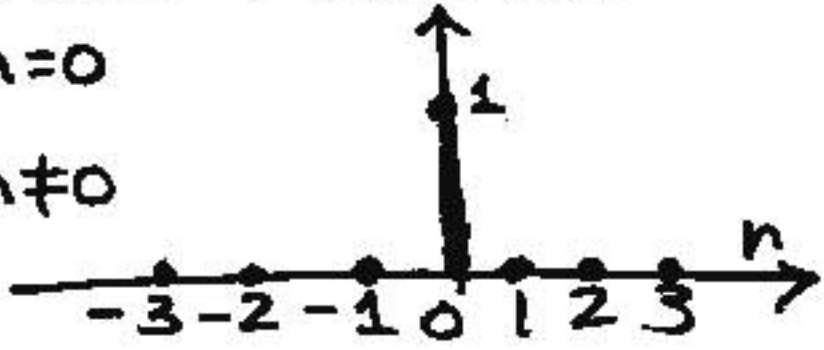
EE538 DSP I

Module 1a

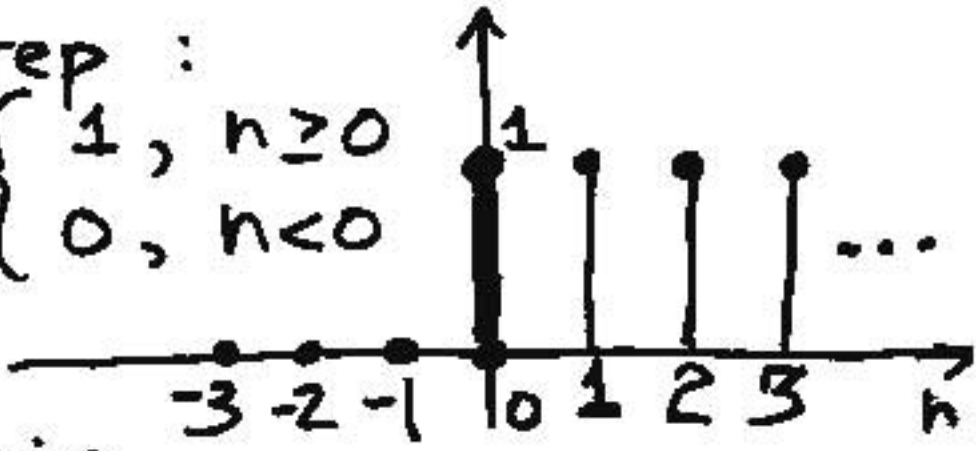
- Chapter 2 of P+M Text
- Discrete-Time Signals
  - special cases
- Kronecker Delta Function:

$$\delta[n] = \begin{cases} 1, & n = 0 \\ 0, & n \neq 0 \end{cases}$$



- unit step :

$$u[n] = \begin{cases} 1, & n \geq 0 \\ 0, & n < 0 \end{cases}$$



- geometric sequences : $x[n] = a^n u[n]$
- a is complex-valued scalar
- observe: $x_a(t) = e^{-bt} u(t)$
- sampling : $x[n] = x_a(nT_s)$

$-\infty < n < \infty$

$$x[n] = e^{-bnT_s} u(nT_s)$$

$$= a^n u[n]$$

where: $a = e^{-bT_s}$

See Fig. 1.2.3 in Text pg 9

- consider: $a = e^{j\omega_0}$

obtain DT sinusoid:

$$x[n] = e^{j\omega_0 n} u[n]$$

- also:

$$x[n] = \cos(\omega_0 n)$$

} real-valued DT sinewave

See Fig. 1.3.4 on pg. 16 of P+M Text