AL- MUSTAQBAL UNIVERSITY COLLEGE
DEPARTMENT OF BIOMEDICAL ENGINEERING

Digital Signal Processing (DSP)

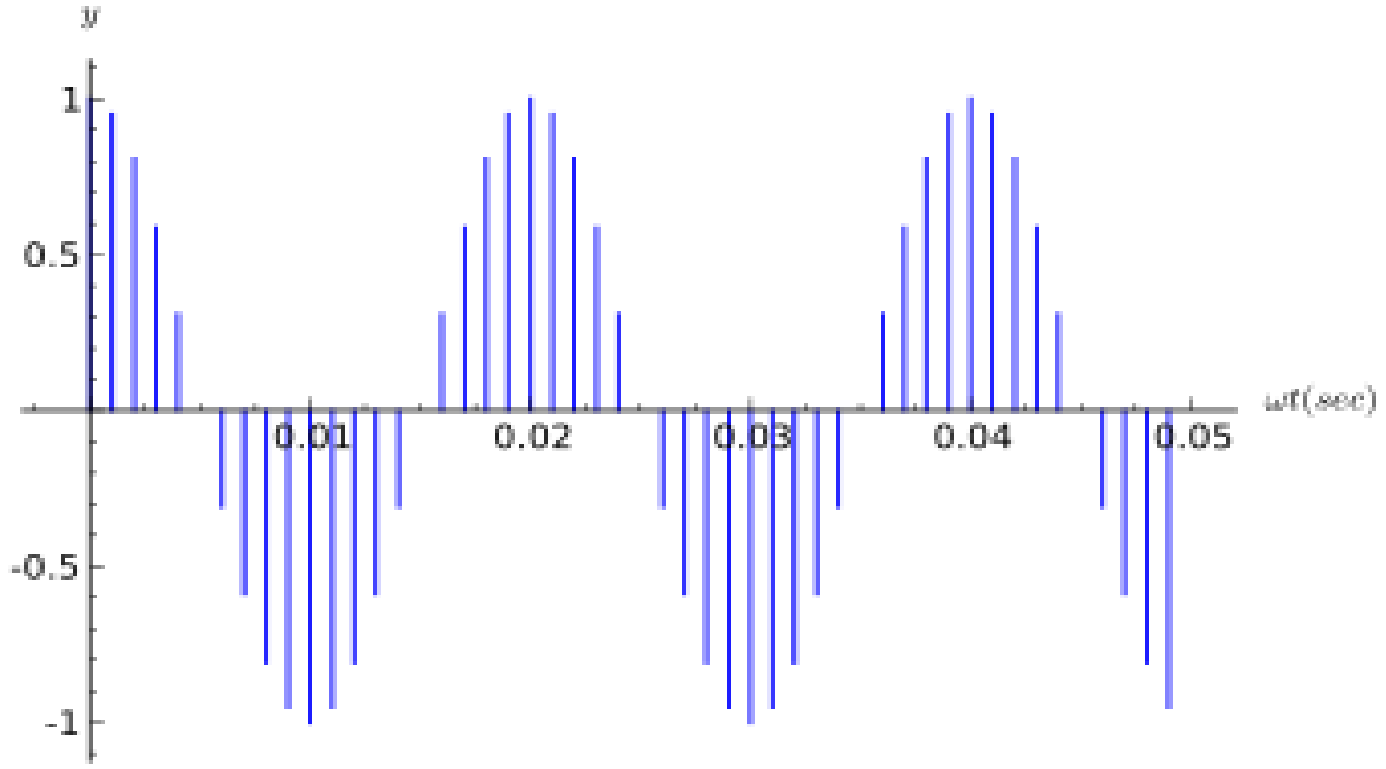
BME 312

Lecture 8

- Sequences -

Dr. Zaidoon AL-Shammari
Lecturer / Researcher
zaidoon.waleed@mustaqbal-college.edu.iq

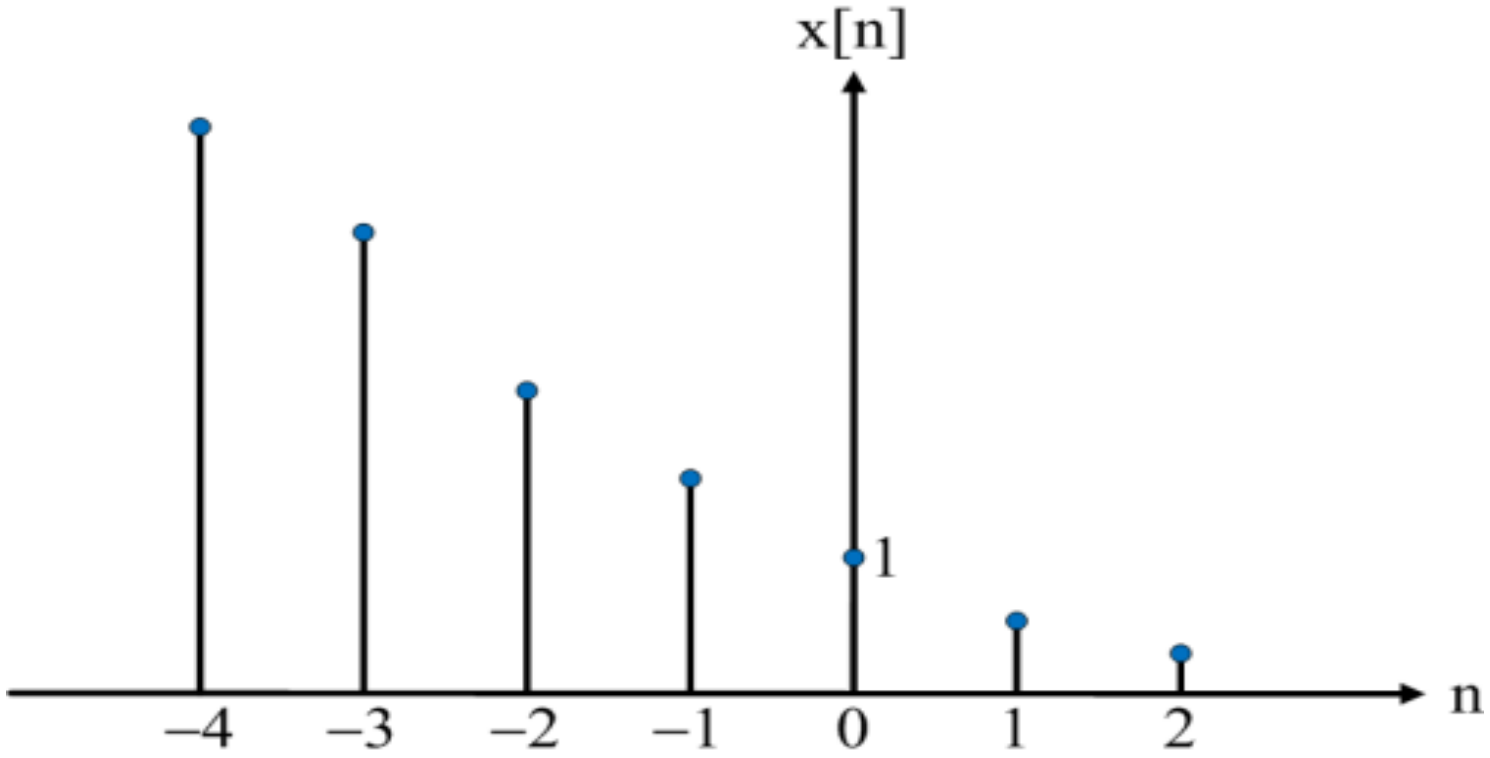
Sequences



Real Exponential Sequence

$$x[n] = a^n$$

$n < 0$



Real Exponential Sequence

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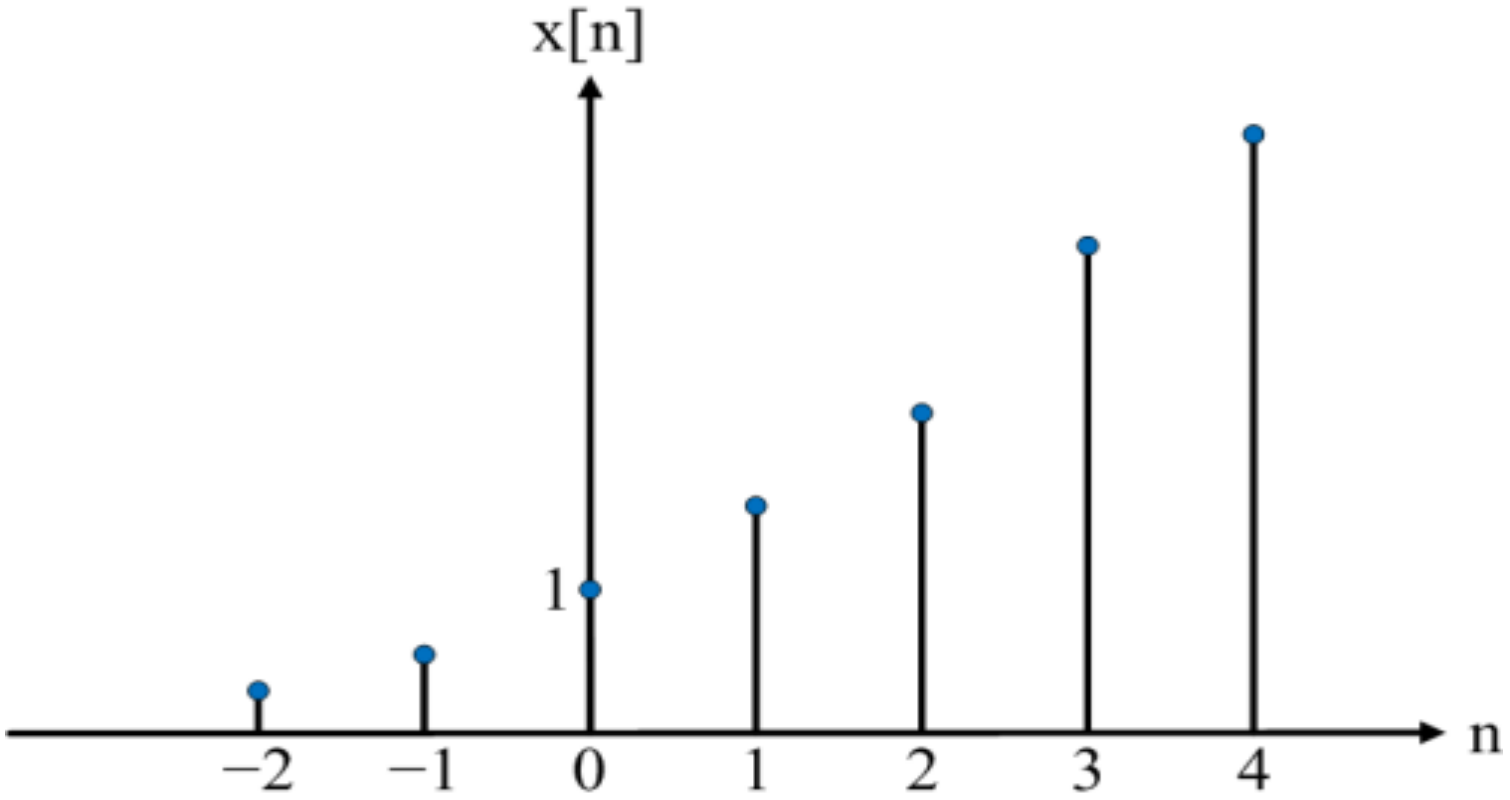
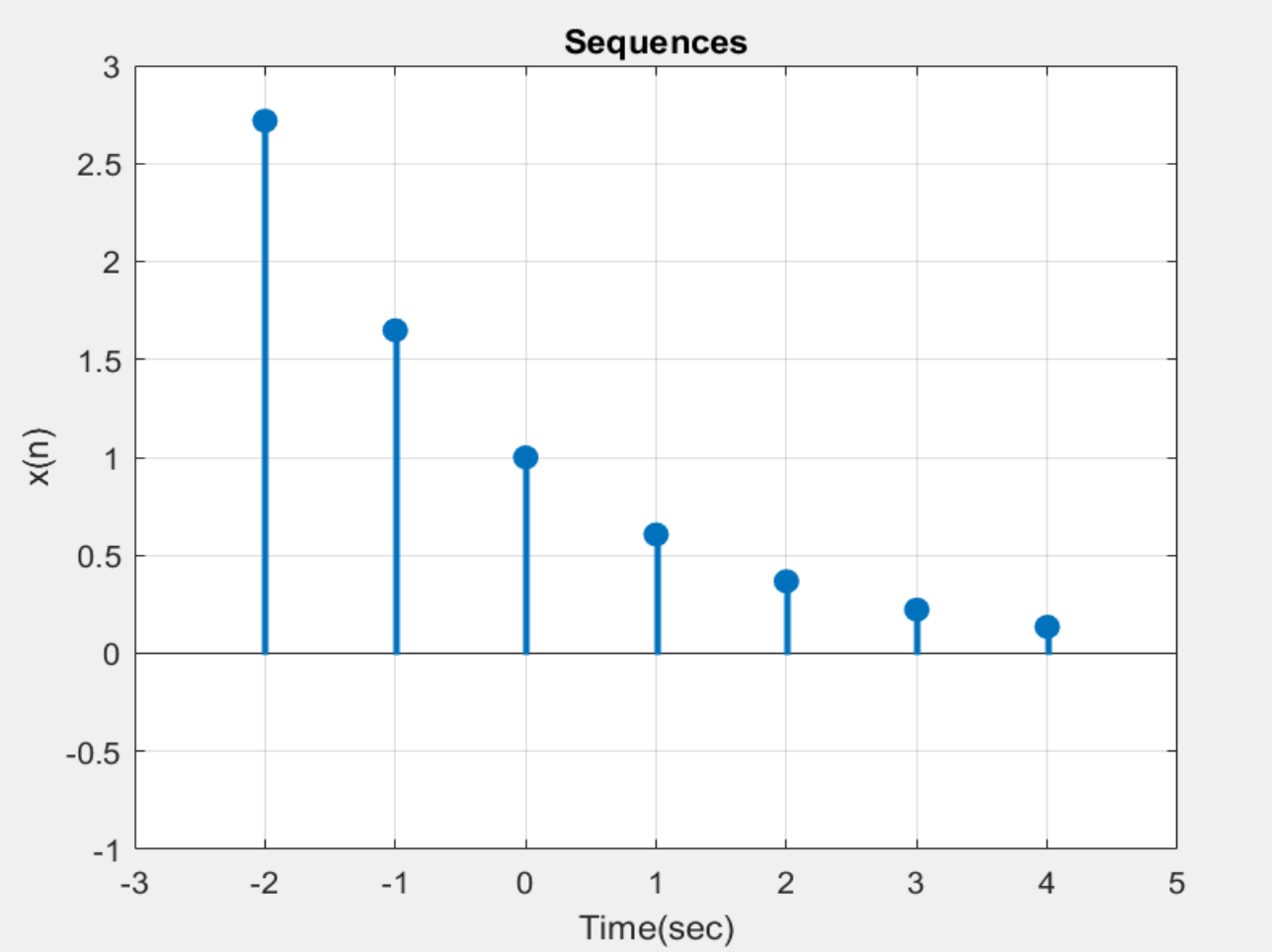


Example 1

Draw the signal $x[n] = e^{-0.5n}$

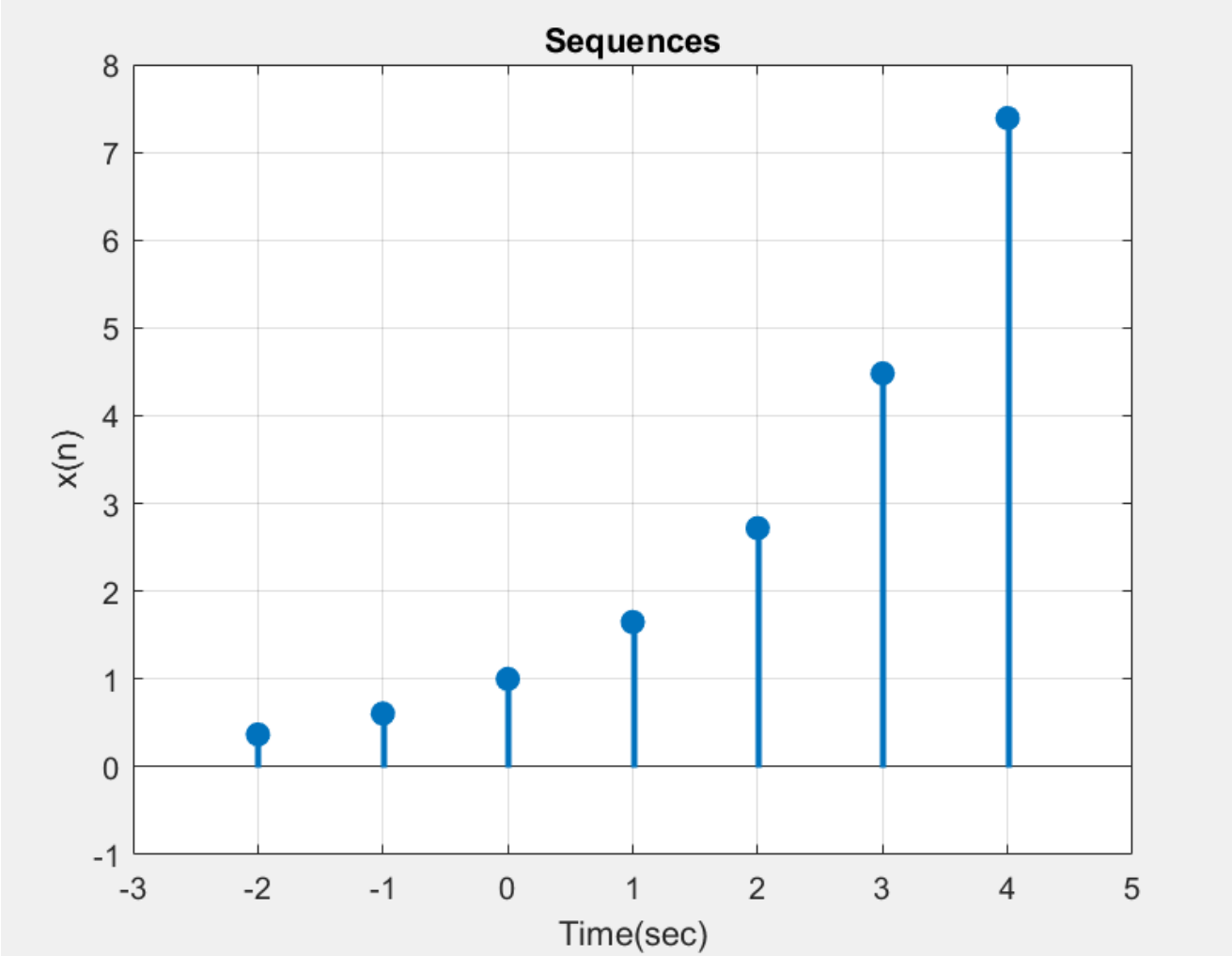
n	x(n)
–2	2.7183
–1	1.6487
0	1.0000
1	0.6065
2	0.3679
3	0.2231
4	0.1353



Example 2

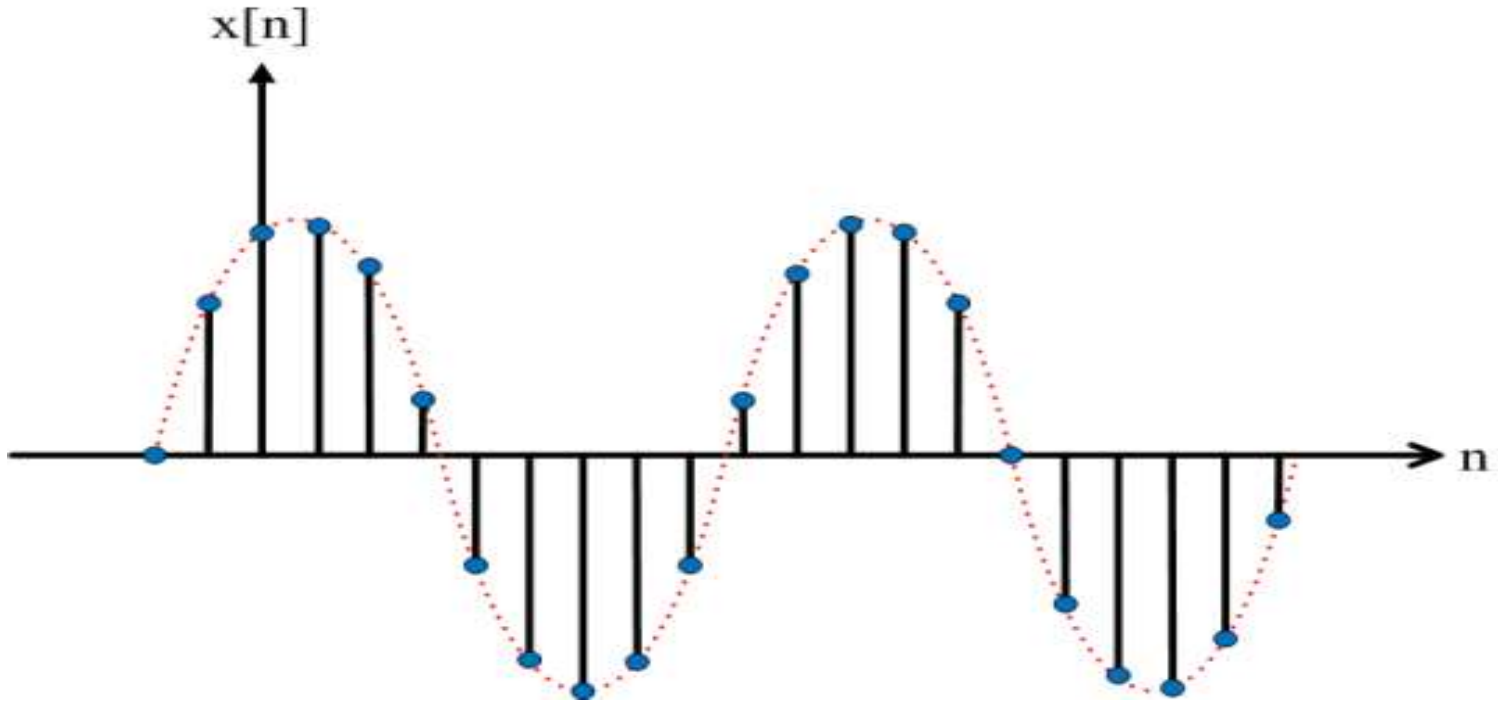
Draw the signal $x[n] = e^{0.5n}$

n	x(n)
–2	0.3679
–1	0.6065
0	1.0000
1	1.6487
2	2.7183
3	4.4817
4	7.3891



Sinusoidal Sequence

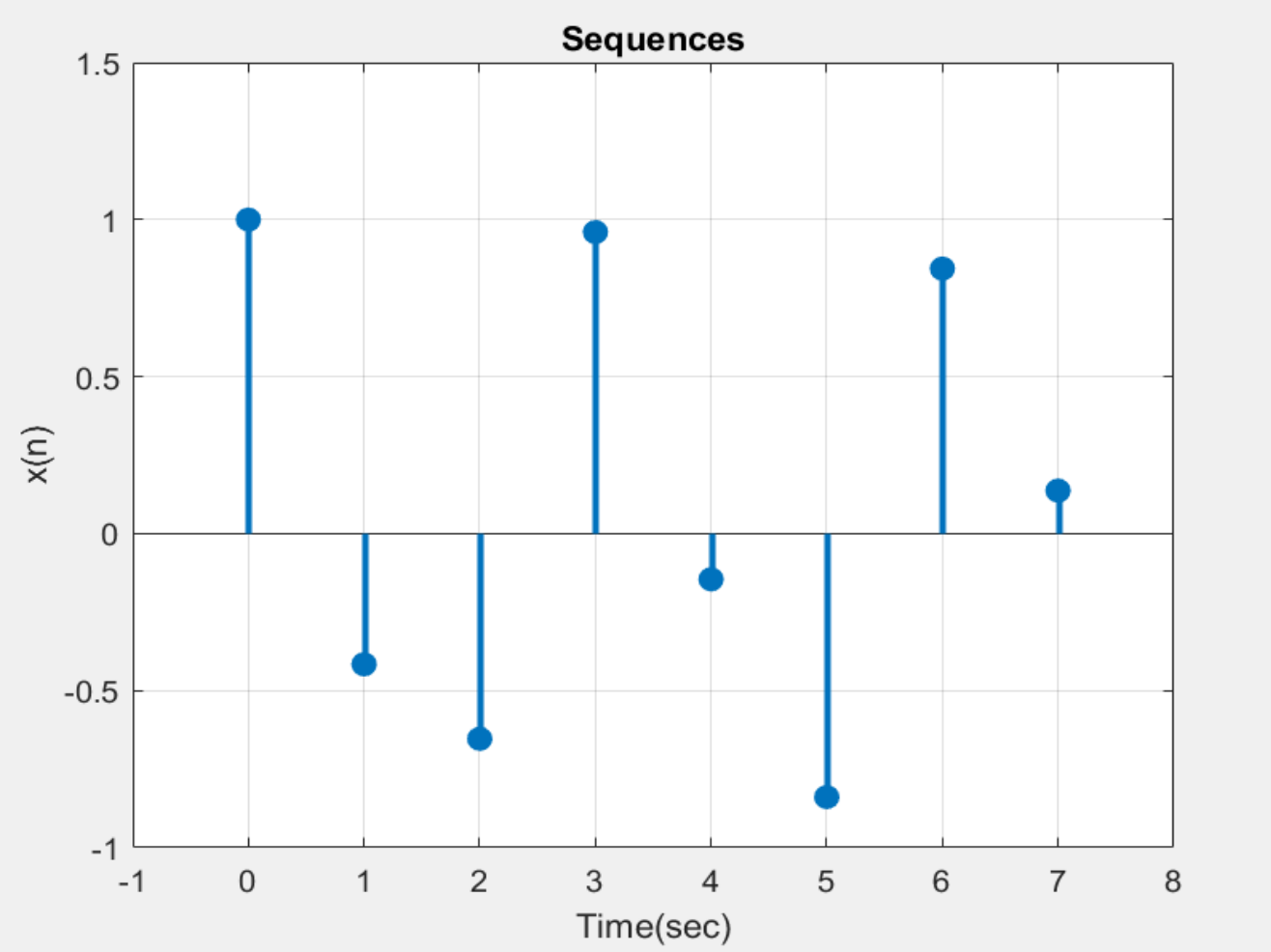
$$x[n] = A\cos(n\omega_0 + \varphi)$$



Example 3

Draw the signal x[n] = cos (2n)

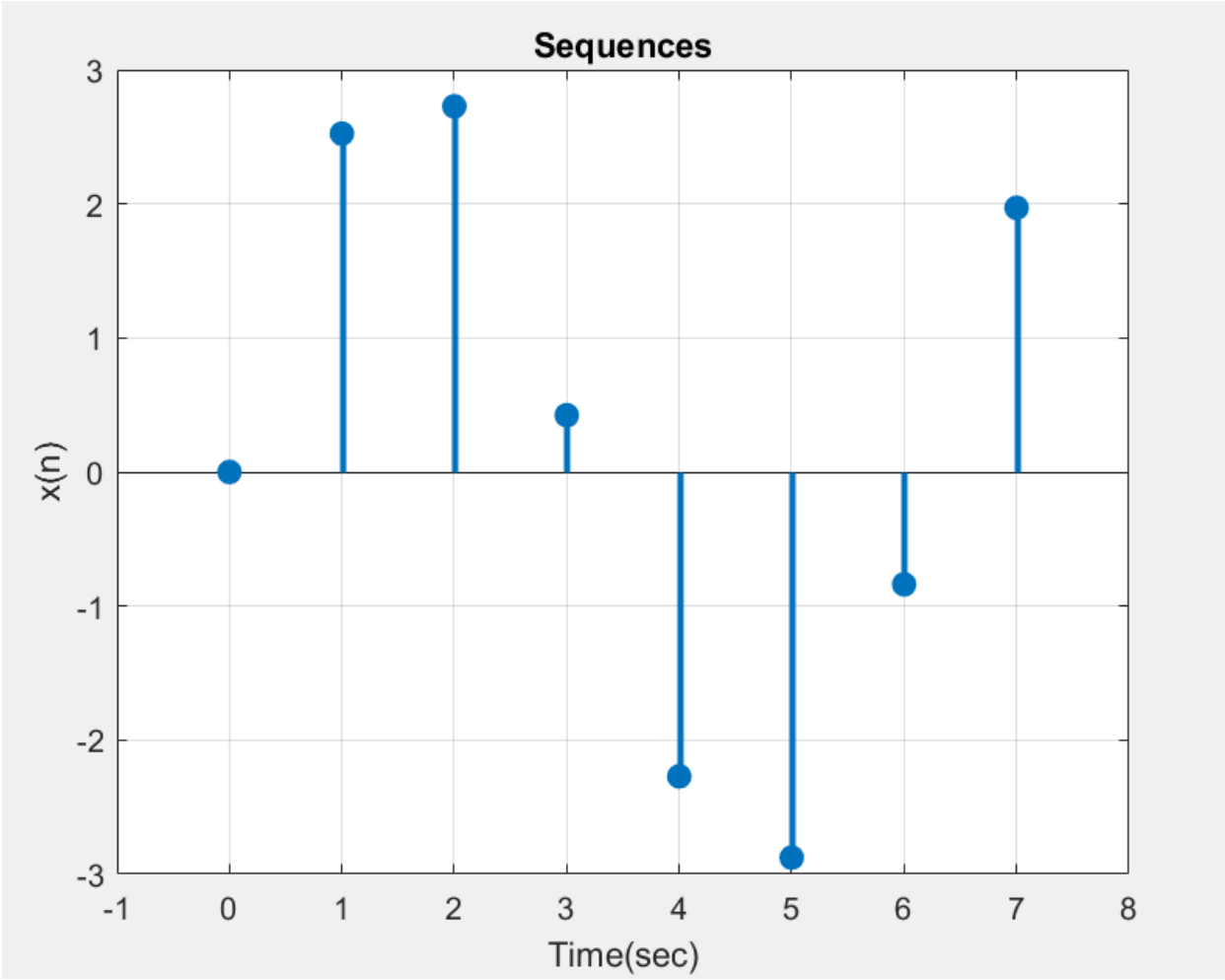
n	x(n)
0	1.0000
1	-0.4161
2	-0.6536
3	0.9602
4	-0.1455
5	-0.8391
6	0.8439
7	0.1367



Example 4

Draw the signal x[n] = 3 sin (n)

n	x(n)
0	0
1	2.5244
2	2.7279
3	0.4234
4	-2.2704
5	-2.8768
6	-0.8382
7	1.9710



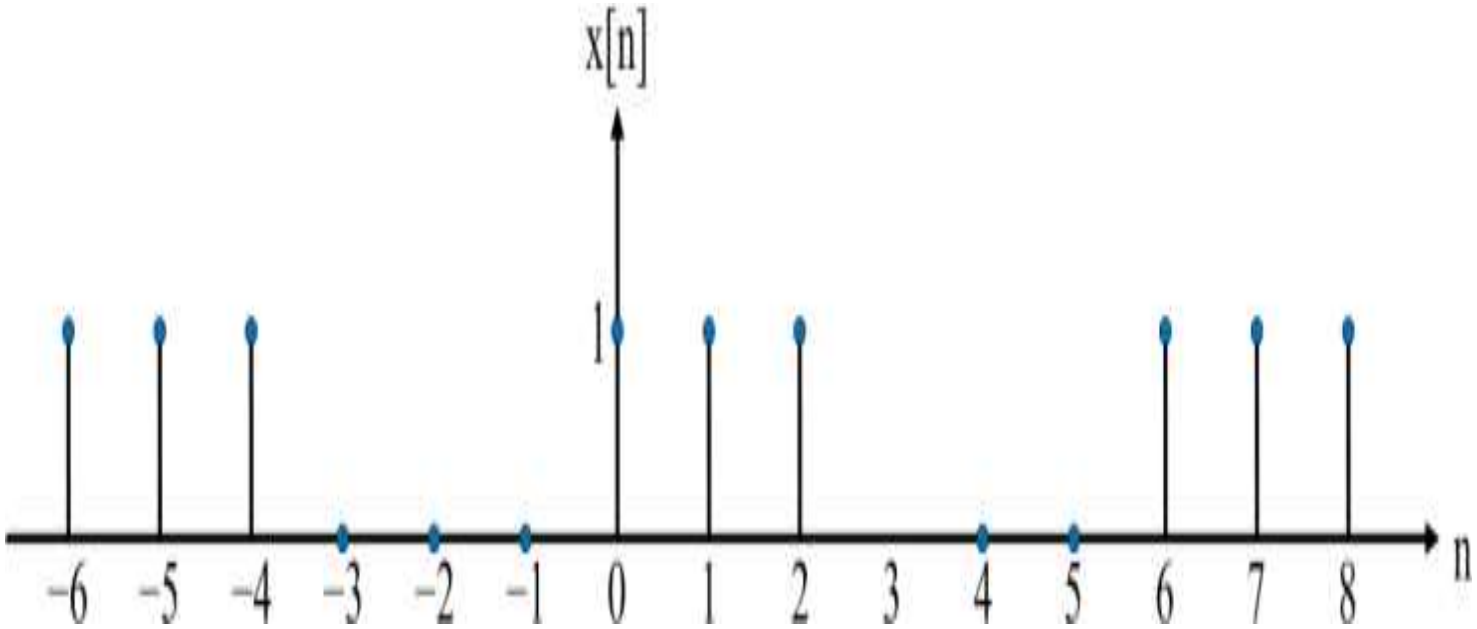
Periodic Signal

- A sequence x(n) is defined to be periodic with period N if :

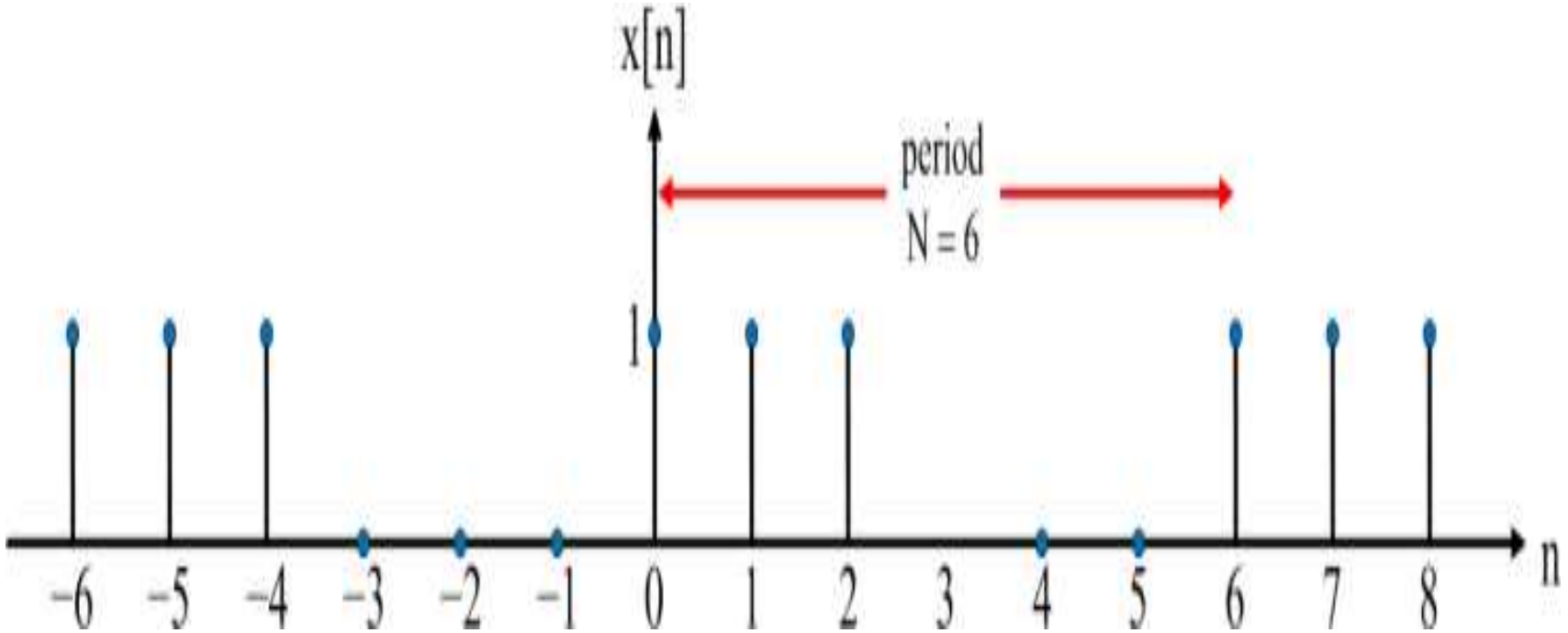
$$x[n] = x[n + N] \quad \text{for all } N$$

Example 5

Is the discrete signal x[n] a periodic signal?



Example 5



The values of x[n] repeat themselves after 6 samples.