1.9.12

EE25BTECH11023 - Venkata Sai

Question:
Find the length of the segment joining **A**$(-6, 7)$ and **B**$(-1, -5)$. Also, find the midpoint of AB.
Solution: We use the distance formula between two points $A\,(x_1, y_1)$ and $B\,(x_2, y_2)$:

Variable	Description
x	x coordinate of P
y	y coordinate of P

TABLE 0: Variables Used

$$\text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \tag{0.1}$$

Substitute $x_1 = -6$, $y_1 = 7$, $x_2 = -1$, $y_2 = -5$

$$\text{Distance} = \sqrt{(-1 - (-6))^2 + (-5 - 7)^2} = \sqrt{(5)^2 + (-12)^2} = \sqrt{25 + 144} = \sqrt{169} = 13 \tag{0.2}$$

The length of the segment joining A and B is 13 sq units.

To find midpoint of AB:
Let the required point be P

$$AP = \frac{1}{2}AB \implies \frac{AR}{RB} = 1 \tag{0.3}$$

$$\mathbf{P} = \frac{k(\mathbf{B}) + (\mathbf{A})}{k + 1} = \begin{pmatrix} x \\ y \end{pmatrix} \tag{0.4}$$

$$\tag{0.5}$$

Here according to problem value of k is 1

$$P = \frac{B + A}{2} = \frac{\begin{pmatrix} -6 \\ 7 \end{pmatrix} + \begin{pmatrix} -1 \\ -5 \end{pmatrix}}{2} = \frac{\begin{pmatrix} -7 \\ 2 \end{pmatrix}}{2} \tag{0.6}$$

$$\tag{0.7}$$

$$P = \begin{pmatrix} \frac{-7}{2} \\ 1 \end{pmatrix} \tag{0.8}$$

Hence the coordinates of **P** are $\left(\frac{-7}{2}, 1\right)$

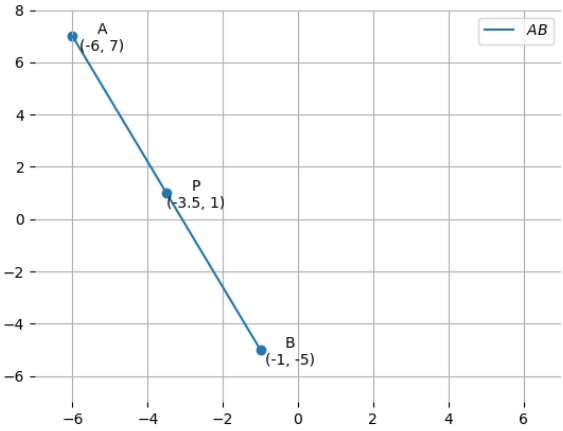

Fig. 0.1: Stem Plot of y(n)