

1.3.9

AI25BTECH110030 - SARVESH TAMGADE

Question:

The center of a circle is at $(2, 0)$. If one end of a diameter is at $(6, 0)$, then find the other end.

Solution:

Since the center \mathbf{C} is the midpoint of the diameter endpoints \mathbf{A} and \mathbf{B} ,

$$\mathbf{C} = \frac{\mathbf{A} + \mathbf{B}}{2}$$

Multiply both sides by 2:

$$2\mathbf{C} = \mathbf{A} + \mathbf{B}$$

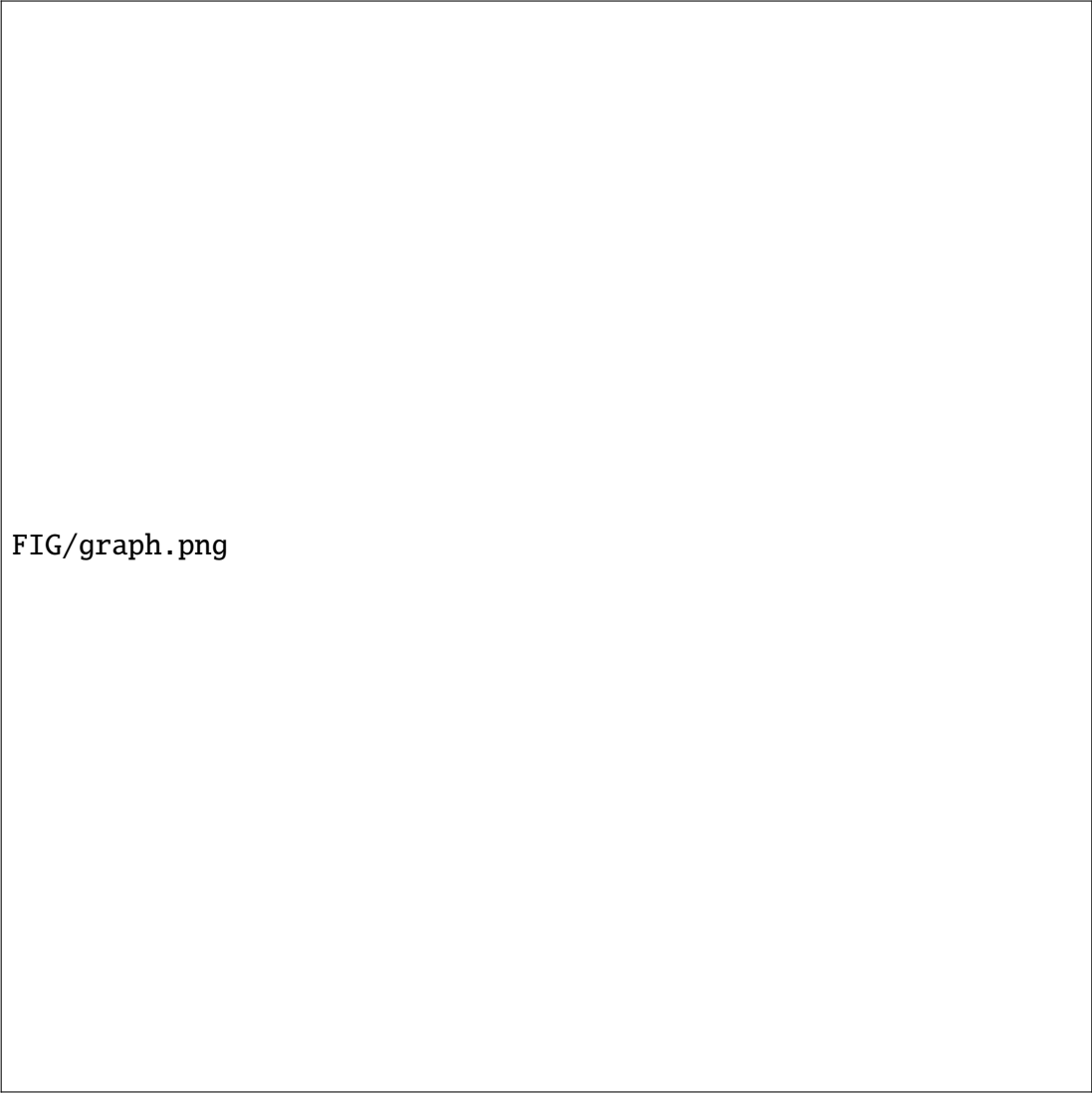
Rearranged for \mathbf{B} :

$$\mathbf{B} = 2\mathbf{C} - \mathbf{A} = 2 \begin{bmatrix} 2 \\ 0 \end{bmatrix} - \begin{bmatrix} 6 \\ 0 \end{bmatrix} = \begin{bmatrix} 4 \\ 0 \end{bmatrix} - \begin{bmatrix} 6 \\ 0 \end{bmatrix} = \begin{bmatrix} -2 \\ 0 \end{bmatrix}$$

Answer: The other end of the diameter is at

$$\mathbf{B} = \begin{bmatrix} -2 \\ 0 \end{bmatrix}$$

Graph:



FIG/graph.png

Fig. 1: Stem plot of $y(n)$