

4-4.2-18

EE24BTECH11030 - J.KEDARANANDA

Question:

Find the direction and normal vectors of each of the following lines $y = x - 2$.

Solution:

Vector	Value
Directional vector	$\begin{pmatrix} 1 \\ m \end{pmatrix}$
Normal vector	$\begin{pmatrix} -m \\ 1 \end{pmatrix}$

TABLE 0

$$y = mx + c \quad (0.1)$$

$$x = 0 \Rightarrow y = c \quad (0.2)$$

$$x = 1 \Rightarrow y = mx + c \quad (0.3)$$

$$x = h + m \quad (0.4)$$

$$m^\top n = 0 \quad (0.5)$$

$$n^\top x = n^\top h + \kappa n^\top m \quad (0.6)$$

$$\Rightarrow n(x - h) = 0 \quad (0.7)$$

$$n^\top x = c \quad (0.8)$$

$$c = n^\top h \quad (0.9)$$

$$\text{where } n = \begin{pmatrix} -m \\ 1 \end{pmatrix} \quad (0.10)$$

For the line $y = x - 2$:

$$m = 1 \quad (0.11)$$

$$\text{Direction vector } m = \begin{pmatrix} 1 \\ m \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \quad (0.12)$$

The normal vector is defined by:

$$n = \begin{pmatrix} -m \\ 1 \end{pmatrix} = \begin{pmatrix} -1 \\ 1 \end{pmatrix} \quad (0.13)$$

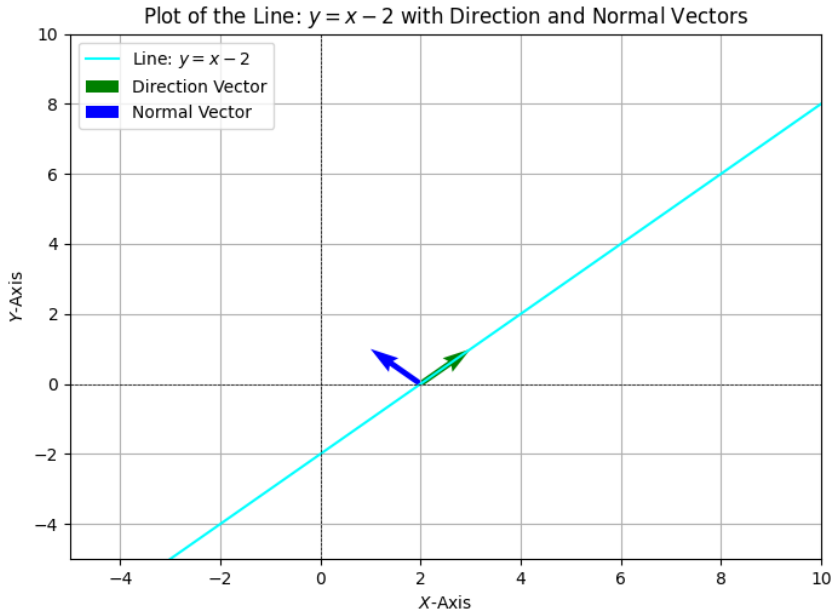


Fig. 0.1