4-4.2-6

EE24BTECH11030 - J.KEDARANANDA

Question:
Find the direction and normal vectors of the following line:
3x + 2 = 0
Solution:

Description	Given value
Line	3x + 2 = 0

TABLE 0

For the line of form Ax+By+C=0

Vector	Symbol	Formula
normal	n	$\begin{pmatrix} A \\ B \end{pmatrix}$
direction	d	$\begin{pmatrix} B \\ -A \end{pmatrix}$

TABLE 0

$$A = 3 \tag{0.1}$$
$$B = 0 \tag{0.2}$$
$$\implies n = \begin{pmatrix} 3 \\ 0 \end{pmatrix} = \begin{pmatrix} 1 \\ 0 \end{pmatrix} \tag{0.3}$$

$$d^T.n = 0 \tag{0.4}$$
$$3a = 0 \tag{0.5}$$
$$\implies d = \begin{pmatrix} 0 \\ -3 \end{pmatrix} = \begin{pmatrix} 0 \\ -1 \end{pmatrix} \tag{0.6}$$

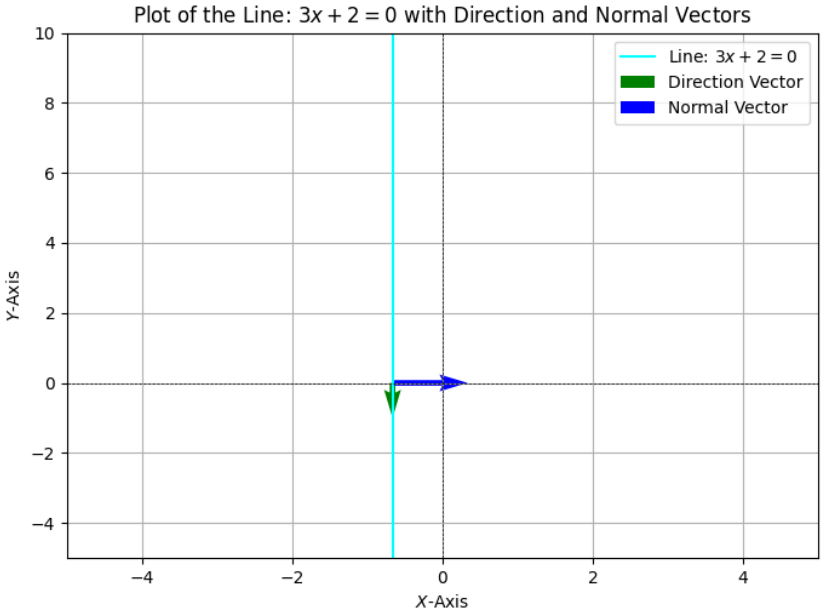
Plot of the Line: $3x + 2 = 0$ with Direction and Normal Vectors
Line: $3x + 2 = 0$
Direction Vector
Normal Vector
Y-Axis
X-Axis
10
8
6
4
2
0
−2
−4
−4
−2
0
2
4

Fig. 0.1