4.3.2

EE24BTECH11002 - Agamjot Singh

Question:
Find the equation of the line passing through $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$ with slope m.

Solution:

Variable	Description
A	$(0, 0)$ point

TABLE 0: Variables Used

Let **n** be the normal vector to the given line.

$$\mathbf{n} = \begin{pmatrix} -m \\ 1 \end{pmatrix} \tag{1}$$

The equation for the line is given by

$$\mathbf{n}^\top (\mathbf{x} - \mathbf{A}) = 0 \tag{2}$$

$$\begin{pmatrix} -m & 1 \end{pmatrix} \left(\mathbf{x} - \begin{pmatrix} 0 \\ 0 \end{pmatrix} \right) = 0 \tag{3}$$
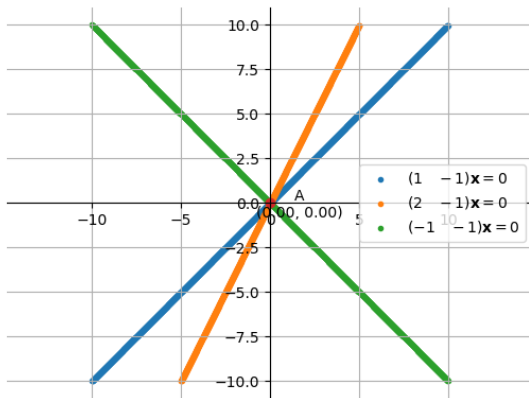
$$\implies \begin{pmatrix} -m & 1 \end{pmatrix} \mathbf{x} = 0 \tag{4}$$

Fig. 0: Representing lines with slopes m = 1, 2, -1