Straight Lines

11^{th} Maths - Chapter 10

This is Problem-3 from Exercise 10.2

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

   Solution: Line passing through point $\mathbf{A} = \begin{pmatrix}0\\0\end{pmatrix}$ is given by,

$$\mathbf{n}^\top (\mathbf{x} - \mathbf{A}) = 0 \tag{1}$$

   Where,

$$\mathbf{n} = \begin{pmatrix}m\\-1\end{pmatrix} \tag{2}$$

$$\mathbf{n}^\top = \begin{pmatrix}m & -1\end{pmatrix} \tag{3}$$

   Substituting $\mathbf{A}$ and $\mathbf{n}$ in equation (1)

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

$$\begin{pmatrix}m & -1\end{pmatrix}\begin{pmatrix}x-0\\y-0\end{pmatrix} = 0 \tag{5}$$

$$\begin{pmatrix}m & -1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix} = 0 \tag{6}$$

$$mx - y = 0 \tag{7}$$

$$y = mx \tag{8}$$

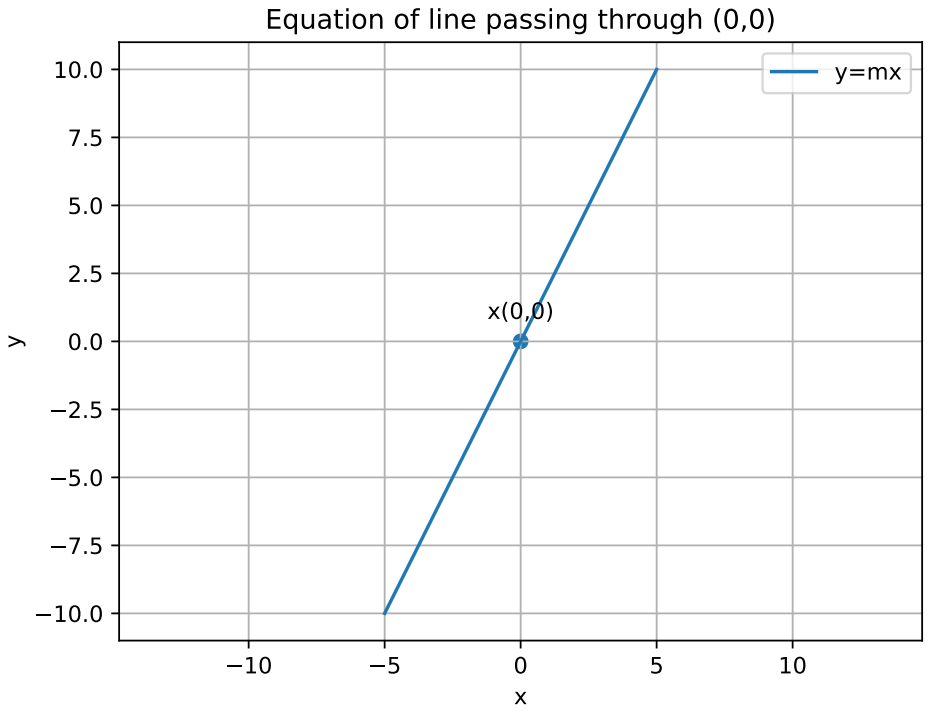
Equation of line passing through (0,0)
y=mx
x(0,0)
10.0
7.5
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
y
−10
−5
0
5
10
x

Figure 1