

# EE2802: Assignment4

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## 1 PROBLEM

A line passes through  $\begin{pmatrix} x_1 \\ y_1 \end{pmatrix}$  and  $\begin{pmatrix} h \\ k \end{pmatrix}$ . If the slope of the line is  $m$ , show that

$$k - y_1 = m(h - x_1) \quad (1.0.1)$$

## 2 SOLUTION

let the direction vector of line joining  $\mathbf{A} = \begin{pmatrix} x_1 \\ y_1 \end{pmatrix}$  and  $\mathbf{B} = \begin{pmatrix} h \\ k \end{pmatrix}$  be  $\mathbf{m}$

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix} x_1 \\ y_1 \end{pmatrix} - \begin{pmatrix} h \\ k \end{pmatrix} \quad (2.0.1)$$

$$\Rightarrow \mathbf{m} = \begin{pmatrix} x_1 - h \\ y_1 - k \end{pmatrix} \quad (2.0.2)$$

$$\mathbf{m} = \begin{pmatrix} x_1 - h \\ y_1 - k \end{pmatrix} \quad (2.0.3)$$

Also, direction vector  $\mathbf{m}$  is given as  $\mathbf{m} = \begin{pmatrix} 1 \\ m \end{pmatrix}$ , where  $m$  is the slope of the line.

$$\mathbf{m} = \begin{pmatrix} 1 \\ m \end{pmatrix} = \begin{pmatrix} x_1 - h \\ y_1 - k \end{pmatrix} \quad (2.0.4)$$

$$\Rightarrow y_1 - k = m(x_1 - h) \quad (2.0.5)$$

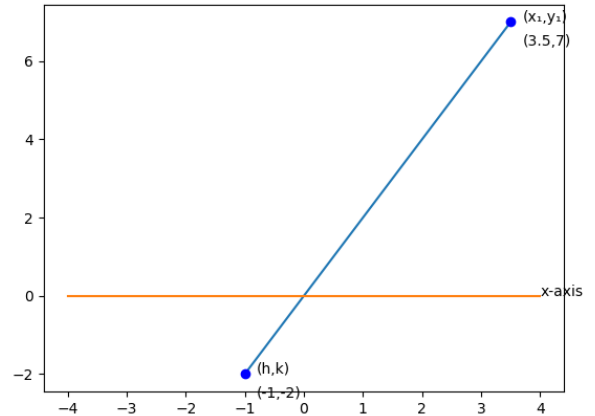


Fig. 0: Figure1