Solution to problem 1.1.1

Aditya Vikram Singh*

Consider a triangle with vertices

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

$$\mathbf{B} = \begin{pmatrix} -4 \\ 6 \end{pmatrix} \tag{2}$$

$$\mathbf{C} = \begin{pmatrix} -3 \\ -5 \end{pmatrix} \tag{3}$$

Question1.1.1
The Direction Vector of AB is defined as

$$\mathbf{B} - \mathbf{A} \tag{4}$$

Find the Direction Vectors of AB,BC,CA.
Solution:

1) The Direction vector of AB is

$$= \mathbf{B} - \mathbf{A} \tag{5}$$

$$= \begin{pmatrix} -4 - (1) \\ 6 - (-1) \end{pmatrix} \tag{6}$$

$$= \begin{pmatrix} -5 \\ 7 \end{pmatrix} \tag{7}$$

2) The Direction vector of BC

$$= \mathbf{C} - \mathbf{B} \tag{8}$$

$$= \begin{pmatrix} -3 - (-4) \\ -5 - (6) \end{pmatrix} \tag{9}$$

$$= \begin{pmatrix} 1 \\ -11 \end{pmatrix} \tag{10}$$

3) The Direction vector of CA

$$= \mathbf{A} - \mathbf{C} \tag{11}$$

$$= \begin{pmatrix} 1 - (-3) \\ -1 - (-5) \end{pmatrix} \tag{12}$$

$$= \begin{pmatrix} 4 \\ 4 \end{pmatrix} \tag{13}$$

*The author is with the Department of Electrical Engineering, Indian Institute of Technology, Hyderabad 502285 India e-mail: gadepall@iith.ac.in.