Problem 1

EE22BTECH11007 - Anek

1.1.4. The parametric form of the equation AB is

$$\mathbf{x} = \mathbf{A} + k\mathbf{m} \tag{1}$$

where

$$\mathbf{m} = \mathbf{B} - \mathbf{A} \tag{2}$$

is the direction vector of AB. Find the parametric equations of AB,BC and CA.
The parametric equation for AB is given by

$$\mathbf{x} = \mathbf{A} + k\mathbf{m} \tag{3}$$

where

$$\mathbf{m} = \mathbf{B} - \mathbf{A} \tag{4}$$
$$= \begin{pmatrix} -4 \\ 6 \end{pmatrix} - \begin{pmatrix} 1 \\ -1 \end{pmatrix} \tag{5}$$
$$= \begin{pmatrix} -5 \\ 7 \end{pmatrix} \tag{6}$$

Hence we get,

$$AB : \mathbf{x} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} + k\begin{pmatrix} -5 \\ 7 \end{pmatrix} \tag{7}$$

The parametric equation for BC is given by

$$\mathbf{x} = \mathbf{B} + k\mathbf{m} \tag{8}$$

where

$$\mathbf{m} = \mathbf{C} - \mathbf{B} \tag{9}$$
$$= \begin{pmatrix} -3 \\ -5 \end{pmatrix} - \begin{pmatrix} -4 \\ 6 \end{pmatrix} \tag{10}$$
$$= \begin{pmatrix} 1 \\ -11 \end{pmatrix} \tag{11}$$

Hence we get,

$$BC : \mathbf{x} = \begin{pmatrix} -4 \\ 6 \end{pmatrix} + k\begin{pmatrix} 1 \\ -11 \end{pmatrix} \tag{12}$$

The parametric equation for CA is given by

$$\mathbf{x} = \mathbf{C} + k\mathbf{m} \tag{13}$$

where

$$\mathbf{m} = \mathbf{A} - \mathbf{C} \tag{14}$$
$$= \begin{pmatrix} 1 \\ -1 \end{pmatrix} - \begin{pmatrix} -3 \\ -5 \end{pmatrix} \tag{15}$$
$$= \begin{pmatrix} 4 \\ 4 \end{pmatrix} \tag{16}$$

Hence we get,

$$CA : \mathbf{x} = \begin{pmatrix} -3 \\ -5 \end{pmatrix} + k\begin{pmatrix} 4 \\ 4 \end{pmatrix} \tag{17}$$

So the parametric equations of AB,BC,CA are:

$$AB : \mathbf{x} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} + k\begin{pmatrix} -5 \\ 7 \end{pmatrix} \tag{18}$$
$$BC : \mathbf{x} = \begin{pmatrix} -4 \\ 6 \end{pmatrix} + k\begin{pmatrix} 1 \\ -11 \end{pmatrix} \tag{19}$$
$$CA : \mathbf{x} = \begin{pmatrix} -3 \\ -5 \end{pmatrix} + k\begin{pmatrix} 4 \\ 4 \end{pmatrix} \tag{20}$$