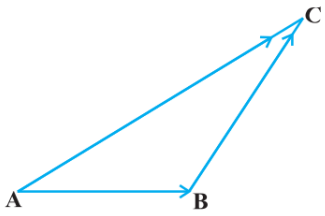
Assignment 1

Jaswanth Chowdary Madala

1) In the following figure for the triangle ABC, which of the following is not true:
(A) $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CA} = \overrightarrow{0}$
(B) $\overrightarrow{AB} + \overrightarrow{BC} - \overrightarrow{AC} = \overrightarrow{0}$
(C) $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{AC} = \overrightarrow{0}$
(D) $\overrightarrow{AB} - \overrightarrow{CB} + \overrightarrow{CA} = \overrightarrow{0}$



Solution: From the triangle law of vector addition, we get

$$\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AC} \tag{0.0.1}$$

$$\Rightarrow \overrightarrow{AB} + \overrightarrow{BC} - \overrightarrow{AC} = \overrightarrow{0} \tag{0.0.2}$$

The equation 0.0.2 is option B.
We know that $\overrightarrow{AC} = -\overrightarrow{CA}$

$$\Rightarrow \overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CA} = \overrightarrow{0} \tag{0.0.3}$$

The equation 0.0.3 is option A.
We know that $\overrightarrow{BC} = -\overrightarrow{CB}$

$$\Rightarrow \overrightarrow{AB} - \overrightarrow{CB} + \overrightarrow{CA} = \overrightarrow{0} \tag{0.0.4}$$

The equation 0.0.4 is option D.
The options A, B, D are correct and the option C is incorrect.