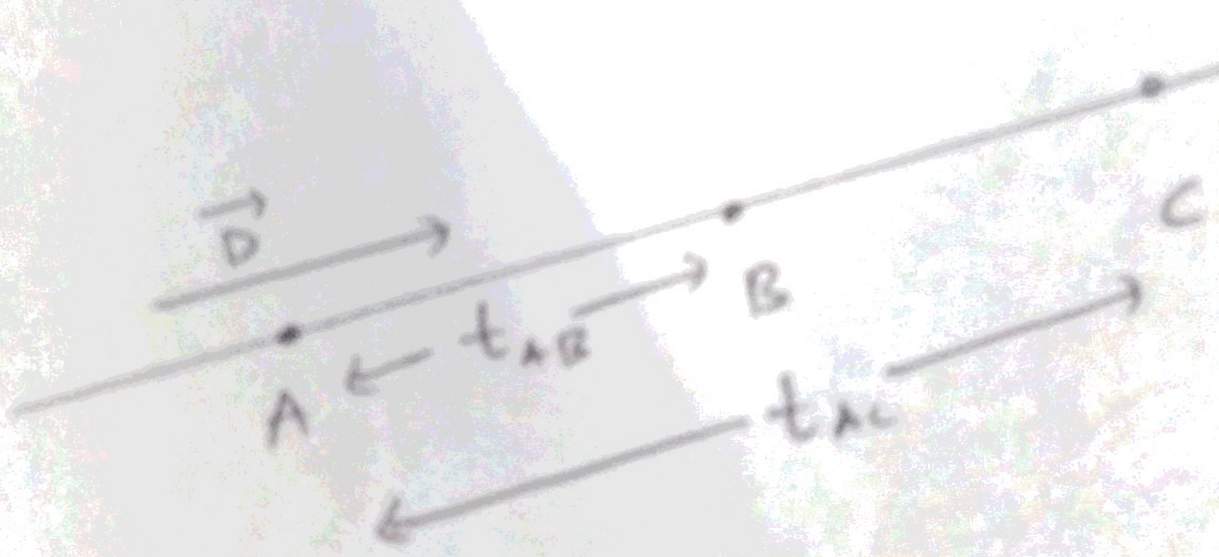
III




$t_{AB}$ & $t_{AC}$ is the Distance between points AB & AC Respectively.

$$B = A + t_{AB} \cdot \vec{D}$$

$$C = A + t_{AC} \cdot \vec{D}$$

$$\text{Ratio} = \left| \frac{t_{AB}}{t_{AC}} \right|$$

Applying Affine Matrix M to these points

$$A' = MA + N$$

$$B' = MB + N$$

$$C' = MC + N$$

$$\text{New Ratio} = \frac{\|B' - A'\|}{\|C' - A'\|} = \frac{\|M\| \, \|B - A\|}{\|M\| \, \|C - A\|}$$

$$= \left| \frac{t_{AB}}{t_{AC}} \right| = \text{Old Ratio}$$