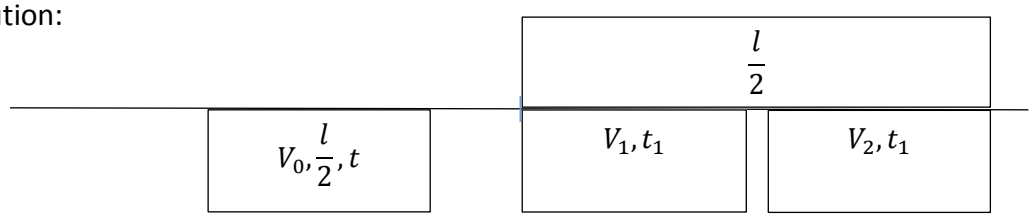
Answer on Question #60960 – Physics – Mechanics | Relativity

Question:

A point object traverses half the distance with velocity v0. The remaining part of the distance was covered with velocity v1 for the half time and with velocity v2 for the rest half. Find the average velocity?

Solution:



The average speed is: $V = \frac{l}{t_{sum}}$

$\frac{l}{2} = V_1 \cdot t_1 + V_2 \cdot t_1 = V_0 \cdot t \Rightarrow t = \frac{(V_1+V_2)t_1}{V_0}, l = 2(V_1 + V_2)t_1$

$t_{sum} = 2t_1 + t = 2t_1 + \frac{(V_1+V_2)t_1}{V_0} = t_1\left(2 + \frac{V_1+V_2}{V_0}\right)$

And now we have:

$$V = \frac{l}{t_{sum}} = \frac{2(V_1+V_2)t_1}{t_1\left(2+\frac{V_1+V_2}{V_0}\right)} = \frac{2(V_1+V_2)}{2+\frac{V_1+V_2}{V_0}} = \frac{2V_0(V_1+V_2)}{2V_0+V_1+V_2}$$

Answer: $V = \frac{2V_0(V_1+V_2)}{2V_0+V_1+V_2}$