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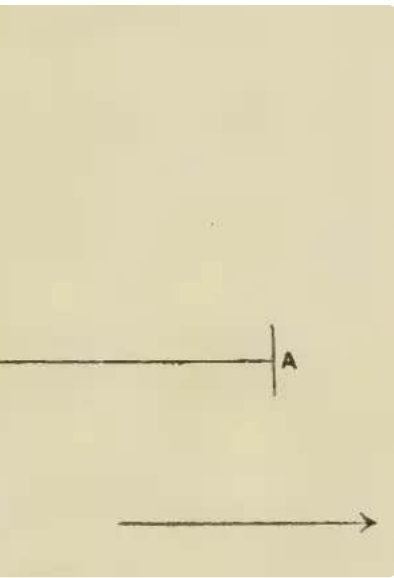
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$$t' + \frac{lv}{c^2} \dots, O-$$

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... H'<sub>0</sub> ...  $\frac{lv}{c^2}$  ...

... S' ... t' +  $\frac{lv}{c^2}$  ...

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$\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}$ ,  
 $\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}(t' + \frac{lv}{c^2})$   
 ,  
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$H_0' H_1'$ ,  
 $\dots H_2', H_1', H_0'$   
 $S-S'$ ,  
 $H_2'-H_0', H_1'-H_1'$ ,  
 $\frac{lv}{c^2}-H_1'$

4.5

$\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}$

$S-S'$   
 $S-S'$

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 $\sqrt{1-\frac{v^2}{c^2}}$

.2  
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$S$  .3  
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S' S , O' X' , X' O' Y' , Z' O' X' , XOY, ZOY  
 , O' x , t' z' , y' , x'  
 , x' + vt' ZOY  
 x' + vt' ,  
 $\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}(x' + vt')$   
 , t'  
 , t'  $\frac{1}{\sqrt{1-\frac{v^2}{c^2}}}(t' + \frac{vx'}{c^2})$   
 .  
 , S' , S' M' z' , y'  
 z, y, x

$$x = x' + vt'$$

$$y = y'$$

$$z = z'$$

$t = t'$

$$= (x' + vt')$$

$$= y'$$

$$= z'$$

①

$$= (t' + \frac{vx'}{c^2})$$

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..... . $\frac{x'}{t}$

, OX ..... ,  
..... , $\frac{x}{t}$  ..... , v''

: .....

$$v'' = \frac{v+v'}{1+\frac{vv'}{c^2}}$$

: .....

$$v'' = v + v'$$

..... S' - ..... S ..... , .....

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v' ..... , ..... . .....

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..... t' - ( ..... )

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x' ..... x' .....  
..... ; x'  $\sqrt{1 - \frac{v^2}{c^2}}$  ..... , (.....

.....  $\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$  (t' +  $\frac{vx'}{c^2}$ )

..... , v'

$$\frac{x' \sqrt{1 - \frac{v^2}{c^2}}}{\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}(t' + \frac{vx'}{c^2})}$$

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$$\frac{v'(1 - \frac{v^2}{c^2})}{1 + \frac{vv'}{c^2}}$$

:XXXXXX X.

$$+ \frac{v'(1 - \frac{v^2}{c^2})}{1 + \frac{vv'}{c^2}} = \frac{v + v'}{1 + \frac{vv'}{c^2}}$$

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XvXXXXXXXXXX Xv'XXXXXXXXXXXXXXXXXXXXXXXXXXXX

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X S''' , S'' XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

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XXXXXXXX .v', t', z', y', x' XXXXX, v'', t', z', y', x' XXXXXXX

:XXXX XXXXX; v', t', z', y', x'

$$= \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} (x - vt)$$

$$y' = y$$

$$z' = z$$

$$= \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} (t - \frac{vx}{c^2})$$

$$v' = \frac{v'' - v}{1 - \frac{vv''}{c^2}}$$

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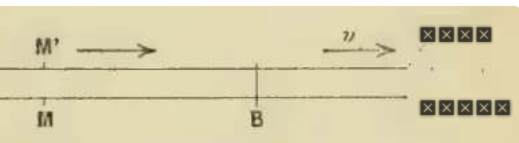
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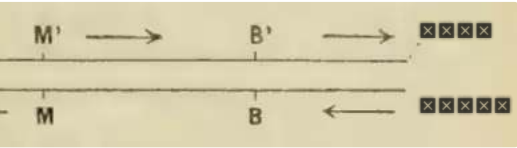
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$E'N'F'$   $M'N'P'$   $S$   $\frac{1}{c}$   $\frac{lv}{c}$   $E'H'$   $E'$   $F'K'$   $N'$   $P'F'$   $S'$   $N'$

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... Bulletin de la Société française de philosophie, 1912 :  
... 61-66 'Espace, temps et gravitation, trad. Rossignol

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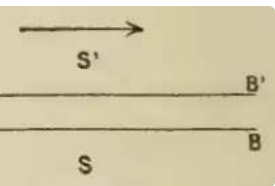
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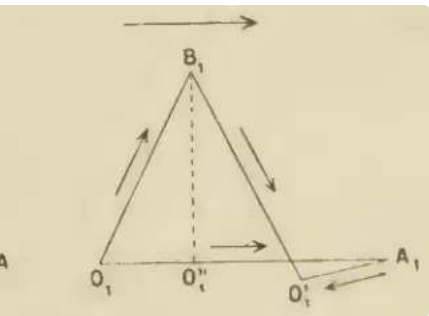
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.....,  $A_1$

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$$\frac{1}{-\frac{v^2}{c^2}} \cdot \frac{lv}{c^2} \dots$$

.....  $l$  .....

$$\frac{l}{-\frac{v^2}{c^2}} - \frac{lv^2}{c^2 \sqrt{1 - \frac{v^2}{c^2}}}$$

.....  $l\sqrt{1 - \frac{v^2}{c^2}}$  .....

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$$\frac{l}{-\frac{v^2}{c^2}} - \frac{lv^2}{c^2 \sqrt{1 - \frac{v^2}{c^2}}}$$

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.....,  $S'$  .....  $A' B'$   
.....,  $l$  .....

$$L^2 = \frac{1}{1 - \frac{v^2}{c^2}} \cdot l^2$$

$$\left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \cdot \frac{lv}{c^2} \right]^2 \dots, \frac{1}{1 - \frac{v^2}{c^2}} \cdot \frac{l^2 v^2}{c^2} \dots ?l$$

.....,  $T$  .....  
.....  $B' A'$  .....  
.....,  $S'$  .....  
.....  $B' A'$  .....  
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.....  $S$  .....  
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$$\dots S' \dots S$$

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.....,  $B' A'$  .....  
.....,  $y_2', x_2'$  .....



$$] - x'_1) + v(t'_2 - t'_1)]^2$$

$$)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2$$

③

vx -

$$, \frac{1}{1 - \frac{v^2}{c^2}} [(x'_2 - x'_1) + v(t'_2 - t'_1)]^2$$

$$(x'_2 - x'_1)^2$$

$$+ \frac{v(x'_2 - x'_1)}{c^2}] - c^2(t'_2 - t'_1)^2$$

$$+ \frac{v(x'_2 - x'_1)}{c^2}] = (t'_2 - t'_1)^2$$

$$)^2 = c^2(t_2 - t_1)^2 - c^2(t'_2 - t'_1)^2$$

$$t_1)^2 = (x'_2 - x'_1)^2 - c^2(t'_2 - t'_1)^2$$

$$c^2(t_2 - t_1)^2 = (x'_2 - x'_1)^2 + (y'_2 - y'_1)^2 + (z'_2 - z'_1)^2$$

$$(y'_2 - y'_1)^2 + (z'_2 - z'_1)^2$$

$$)^2 + (z'_2 - z'_1)^2 - c^2(t'_2 - t'_1)^2$$

$$y_1)^2 + (z_2 - z_1)^2 - c^2(t_2 - t_1)^2$$

$S' - S$   
 $t_2' - t_1' = 0$

$$\begin{aligned}
 & + (y_2 - y_1)^2 \\
 & (x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2 \\
 & 4, 5, 6, \dots, n \\
 & B' - A' \\
 & (y_2 - y_1)^2 + (z_2 - z_1)^2 - c^2 (t_2 - t_1)^2
 \end{aligned}$$

$\Delta \tau, \Delta z, \Delta y$   
 $\tau, z, y, x$   
 $\Delta s$   
 $\Delta s^2 + \Delta y^2 + \Delta z^2 + \Delta \tau^2$

$\frac{dx}{dt} = v$ ,  $\frac{dy}{dt} = v \sin \theta$ ,  $\frac{dz}{dt} = v \cos \theta$

$\frac{dx^2}{dt^2} + \frac{dy^2}{dt^2} + \frac{dz^2}{dt^2} = v^2$

$c^2 + dy^2 + dz^2 + d\tau^2$

$\frac{dx^2}{dt^2} + \frac{dy^2}{dt^2} + \frac{dz^2}{dt^2} = v^2$

$\frac{dx^2}{dt^2} + \frac{dy^2}{dt^2} + \frac{dz^2}{dt^2} + d\tau^2$

$\frac{dx^2}{dt^2} + \frac{dy^2}{dt^2} + \frac{dz^2}{dt^2} = v^2$

$\frac{dz^2}{dt^2} - c^2 dt^2$  (1)

$\frac{dz^2}{dt^2} - c^2 dt^2 = v^2 dt^2 - c^2 dt^2$





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$\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \right) \right) \right]$

.154  $\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$  (1)

$\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \right) \right) \right]$

$$\begin{aligned}
 & - \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \right) \right) \right] \\
 & \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \right) \right) \right]
 \end{aligned}$$

$\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \right) \right) \right]$

$$\begin{aligned}
 & \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \right) \right) \right] \\
 & \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \right) \right) \right]
 \end{aligned}$$

193  $\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$  (1)

194  $\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$  (2)

$\frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left[ \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \left( \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \right) \right) \right]$









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