Формулы для оценки величин импульсов к статье "Использование закона сохранения импульса для проверки справедливости применения специальной теории относительности" ("Using the law of conservation of momentum for test the validity of the special theory of relativity")

Кочетков Виктор Николаевич

Cochetkov Victor Nikolayevich

vnkochetkov@gmail.com

vnkochetkov@rambler.ru

http://www.matphysics.ru

Тело 1 (Body 1)

$$x_1 = R \cdot \cos(\omega \cdot t_1) \qquad (1)$$

$$y_1 = R \cdot \sin(\omega \cdot t_1) \qquad (2)$$

$$x'_1 = g \cdot [x_1 - (V \cdot t_1)] \qquad (3)$$

$$y'_1 = y_1 \qquad (4)$$

$$\bar{x}_1 = \cos(\bar{\omega} \cdot \bar{t}_1) \qquad (5)$$

$$\bar{y}_1 = \sin(\bar{\omega} \cdot \bar{t}_1) \qquad (6)$$

$$\bar{x}'_1 = g \cdot [\bar{x}_1 - (\bar{V} \cdot \bar{t}_1)] \qquad (7)$$

$$\bar{y}'_1 = \bar{y}_1 \qquad (8)$$

$$\bar{t}'_1 = g \cdot [\bar{t}_1 - (\bar{V} \cdot \bar{x}_1)] \qquad (9)$$

$$\bar{x}_1 = \frac{x_1}{R} \qquad (10)$$

$$\bar{y}_1 = \frac{y_1}{R} \qquad (11)$$

$$\bar{x}'_1 = \frac{x'_1}{R} \tag{12}$$

$$\bar{y}'_1 = \frac{y'_1}{R} \tag{13}$$

$$\bar{V} = \frac{V}{c} \tag{14}$$

$$\bar{\omega} = \frac{R \cdot \omega}{c} \tag{15}$$

$$g = \frac{1}{\sqrt{1 - \bar{V}^2}} \tag{16}$$

$$\bar{t}_1 = \frac{c \cdot t_1}{R} \tag{17}$$

$$\bar{t}'_1 = \frac{c \cdot t'_1}{R} \tag{18}$$

$$\bar{V}_{x1} = \frac{d\bar{x}_1}{d\bar{t}_1} = - \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_1) \tag{19}$$

$$\bar{V}_{y1} = \frac{d\bar{y}_1}{d\bar{t}_1} = \bar{\omega} \cdot \cos(\bar{\omega} \cdot \bar{t}_1) \tag{20}$$

$$\bar{V}'_{x1} = \frac{d\bar{x}'_1}{d\bar{t}'_1} = \frac{\bar{V}_{x1} - \bar{V}}{1 - (\bar{V}_{x1} \cdot \bar{V})} = - \frac{[\bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_1)] + \bar{V}}{1 + [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_1)]} \tag{21}$$

$$\bar{V}'_{y1} = \frac{d\bar{y}'_1}{d\bar{t}'_1} = \frac{\bar{V}_{y1}}{g \cdot [1 - (\bar{V}_{x1} \cdot \bar{V})]} = \frac{\bar{\omega} \cdot \cos(\bar{\omega} \cdot \bar{t}_1)}{g \cdot \{1 + [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_1)]\}} \tag{22}$$

$$\bar{V}'^{\,2}_1 = \bar{V}'^{\,2}_{1x} + \bar{V}'^{\,2}_{1y} = \\ = \frac{\bar{\omega}^2 + \bar{V}^2 - (\bar{\omega}^2 \cdot \bar{V}^2) + \{1 + [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_1)]\}^2 - 1}{\{1 + [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_1)]\}^2} \tag{23}$$

$$g'_{m1} = \frac{1}{\sqrt{1 - \bar{V}'^{\,2}_1}} = \frac{1 + [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_1)]}{\sqrt{(\bar{\omega}^2 \cdot \bar{V}^2) - \bar{\omega}^2 - \bar{V}^2 + 1}} \tag{24}$$

$$\bar{P}'_{x1} = \bar{V}'_{x1} \cdot g'_{m1} = - \frac{[\bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_1)] + \bar{V}}{\sqrt{1 - \bar{V}^2} \cdot \sqrt{1 - \bar{\omega}^2}} \tag{25}$$

$$\bar{P}'_{y1} = \bar{V}'_{y1} \cdot g'_{m1} = \frac{\bar{\omega} \cdot \cos(\bar{\omega} \cdot \bar{t}_1)}{\sqrt{1-\bar{\omega}^2}} \qquad (26)$$

$$\bar{P}'_1{}^2 = \bar{P}'_{x1}{}^2 + \bar{P}'_{y1}{}^2 = \frac{\{1 + [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_1)]\}^2}{(1-\bar{V}^2) \cdot (1-\bar{\omega}^2)} - 1 \qquad (27)$$

Тело 2 (Body 1)

$$x_2 = -R \cdot \cos(\omega \cdot t_2) \qquad (28)$$

$$y_2 = -R \cdot \sin(\omega \cdot t_2) \qquad (29)$$

$$x'_2 = g \cdot [x_2 - (V \cdot t_2)] \qquad (30)$$

$$y'_2 = y_2 \qquad (31)$$

$$\bar{x}_2 = -\cos(\bar{\omega} \cdot \bar{t}_2) \qquad (32)$$

$$\bar{y}_2 = -\sin(\bar{\omega} \cdot \bar{t}_1) \qquad (33)$$

$$\bar{x}'_2 = g \cdot [\bar{x}_2 - (\bar{V} \cdot \bar{t}_2)] \qquad (34)$$

$$\bar{y}'_2 = \bar{y}_2 \qquad (35)$$

$$\bar{t}'_2 = g \cdot [\bar{t}_2 - (\bar{V} \cdot \bar{x}_2)] \qquad (36)$$

$$\bar{x}_2 = \frac{x_2}{R} \qquad (37)$$

$$\bar{y}_2 = \frac{y_2}{R} \qquad (38)$$

$$\bar{x}'_2 = \frac{x'_2}{R} \qquad (39)$$

$$\bar{y}'_2 = \frac{y'_2}{R} \qquad (40)$$

$$\bar{t}_2 = \frac{c \cdot t_2}{R} \qquad (41)$$

$$\bar{t}'_2 = \frac{c \cdot t'_2}{R} \qquad (42)$$

$$\bar{V}_{x2} = \frac{d\bar{x}_2}{d\bar{t}_2} = \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_2) \quad (43)$$

$$\bar{V}_{y2} = \frac{d\bar{y}_2}{d\bar{t}_2} = -\bar{\omega} \cdot \cos(\bar{\omega} \cdot \bar{t}_2) \quad (44)$$

$$\bar{V}'_{x2} = \frac{d\bar{x}'_2}{d\bar{t}'_2} = \frac{\bar{V}_{x2} - \bar{V}}{1 - (\bar{V}_{x2} \cdot \bar{V})} = \frac{[\bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_2)] - \bar{V}}{1 - [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_2)]} \quad (45)$$

$$\bar{V}'_{y2} = \frac{d\bar{y}'_2}{d\bar{t}'_2} = \frac{\bar{V}_{y2}}{g \cdot [1 - (\bar{V}_{x2} \cdot \bar{V})]} = -\frac{\bar{\omega} \cdot \cos(\bar{\omega} \cdot \bar{t}_2)}{g \cdot \{1 - [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_2)]\}} \quad (46)$$

$$\bar{V}'^{\,2}_{2} = \bar{V}'^{\,2}_{2x} + \bar{V}'^{\,2}_{2y} =$$
$$= \frac{\bar{\omega}^2 + \bar{V}^2 - (\bar{\omega}^2 \cdot \bar{V}^2) + \{1 - [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_2)]\}^2 - 1}{\{1 - [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_2)]\}^2} \quad (47)$$

$$g'_{m2} = \frac{1}{\sqrt{1 - \bar{V}'^{\,2}_{2}}} = \frac{1 - [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_2)]}{\sqrt{(\bar{\omega}^2 \cdot \bar{V}^2) - \bar{\omega}^2 - \bar{V}^2 + 1}} \quad (48)$$

$$\bar{P}'_{x2} = \bar{V}'_{x2} \cdot g'_{m2} = \frac{[\bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_2)] - \bar{V}}{\sqrt{1 - \bar{V}^2} \cdot \sqrt{1 - \bar{\omega}^2}} \quad (49)$$

$$\bar{P}'_{y2} = \bar{V}'_{y2} \cdot g'_{m2} = -\frac{\bar{\omega} \cdot \cos(\bar{\omega} \cdot \bar{t}_2)}{\sqrt{1 - \bar{\omega}^2}} \quad (50)$$

$$\bar{P}'^{\,2}_{2} = \bar{P}'^{\,2}_{x2} + \bar{P}'^{\,2}_{y2} = \frac{\{1 - [\bar{V} \cdot \bar{\omega} \cdot \sin(\bar{\omega} \cdot \bar{t}_2)]\}^2}{(1 - \bar{V}^2) \cdot (1 - \bar{\omega}^2)} - 1 \quad (51)$$

<u>Система тел 1 и 2 (и нить 3)</u>

<u>(The system of bodies 1 and 2 (and the string 3))</u>

$$\bar{P}'_{x\Sigma} = \bar{P}'_{x1} + \bar{P}'_{x2} = \frac{\bar{\omega} \cdot [\sin(\bar{\omega} \cdot \bar{t}_2) - \sin(\bar{\omega} \cdot \bar{t}_1)] - 2 \cdot \bar{V}}{\sqrt{1 - \bar{V}^2} \cdot \sqrt{1 - \bar{\omega}^2}} \quad (52)$$

$$\bar{P}'_{y\Sigma} = \bar{P}'_{y1} + \bar{P}'_{y2} = \frac{\bar{\omega} \cdot [\cos(\bar{\omega} \cdot \bar{t}_1) - \cos(\bar{\omega} \cdot \bar{t}_2)]}{\sqrt{1 - \bar{\omega}^2}} \quad (53)$$

$$\overline{P'}_{\Sigma}{}^{2} = \overline{P'}_{x\Sigma}{}^{2} + \overline{P'}_{y\Sigma}{}^{2} = \frac{\{\bar{\omega}\cdot[\sin(\bar{\omega}\cdot\bar{t}_2)-\sin(\bar{\omega}\cdot\bar{t}_1)]-2\cdot\bar{V}\}^2}{(1-\bar{V}^2)\cdot(1-\bar{\omega}^2)} + \frac{\bar{\omega}^2\cdot[\cos(\bar{\omega}\cdot\bar{t}_1)-\cos(\bar{\omega}\cdot\bar{t}_2)]^2}{(1-\bar{\omega}^2)} \quad (54)$$

$$\tan\alpha = \frac{\overline{P'}_{y\Sigma}}{\overline{P'}_{x\Sigma}} = \frac{\{\bar{\omega}\cdot[\cos(\bar{\omega}\cdot\bar{t}_1)-\cos(\bar{\omega}\cdot\bar{t}_2)]\}\cdot\sqrt{1-\bar{V}^2}}{\bar{\omega}\cdot[\sin(\bar{\omega}\cdot\bar{t}_2)-\sin(\bar{\omega}\cdot\bar{t}_1)]-2\cdot\bar{V}} \quad (55)$$

Связь между $\bar{t}_1$ и $\bar{t}_2$

(Relationship between $\bar{t}_1$ and $\bar{t}_2$)

Условие:

$$\bar{t}'_1 = \bar{t}'_2 \quad (56)$$

$$\bar{t}_1 - (\bar{V}\cdot\bar{x}_1) = \bar{t}_2 - (\bar{V}\cdot\bar{x}_2) \quad (57)$$

$$\bar{t}_1 - [\bar{V}\cdot\cos(\bar{\omega}\cdot\bar{t}_1)] = \bar{t}_2 + [\bar{V}\cdot\cos(\bar{\omega}\cdot\bar{t}_2)] \quad (58)$$