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GLOBAL VAN-CONG EFFECTIVE KINETIC, GRAVITATIONAL POTENTIAL, AND TOTAL ENERGIES, OBTAINED IN THE PLANET-SUN INTERACTION SYSTEM, AND ENHANCED BY OUR EMPIRICAL GLOBAL EFFECTIVE KINETIC MASS OF THE PLANET, EXPRESSED AS A FUNCTION OF ANY SPEED (OR ANY RELATIVITY); APHELION (39)

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ABSTRACT

In this work, we present the new expressions of global effective kinetic, gravitational potential and total energies, obtained in the planet-sun interaction systems, as those given in Equations (4, 5, 6), and enhanced by a new global effective kinetic mass of the planet, as that given in Eq. (1). Some concluding remarks are given as follows. At the low speed v (<< c), c being the light speed, given in the non-relativistic case, they are found to be correct. At v=c, given in the relativistic case, the kinetic energy is found to be equal to: $m \times c^2 \times \left[\frac{2+p}{4}\right]$, for $p > 0$, and, in particular, for p=2, to: $m \times c^2$, in good accordance with that proposed by Einstein in 1905.[1] m being the rest mass of the planet, as those shown in Tables 2-11, for various planet-sun interaction systems.

KEYWORDS: Global effective kinetic-potential-total energies, global effective kinetic mass, light speed, relativity, non-relativity.

First of all, from the expression of the kinetic energy of the planet, with its rest mass m, in motion with a speed v, being equal to the light speed c, $\frac{2m\times c^2}{2}$, and proposed by Einstein in 1905.[1,3] we propose a **gobal effective kinetic mass**, valid at any v, by.[4]

$$m^*(v; p > 0) = m \times (1 + p \times \frac{v^2}{c^2}), \qquad (1)$$

increasing with increasing v and noting that at lowest v: $m^*(v; p) \simeq m$, given in the non-relativistic case, and then, at v=c, given in the relativistic case: $m^*(v = c; p) = m \times (1 + p)$. Here, the numerical results of m and c are given in Table 1 in Appendix 1.

Then, from Eq. (1), this planet is in motion, due to the **global effective Newton force**:

$$F^*_{GEN}(v; p) \equiv m^*(v; p) \times \frac{dv}{dt} = m \times \left(1 + p \times \frac{v^2}{c^2}\right) \times \frac{dv}{dt}, \quad (2)$$

where $\frac{dv}{dt}$ is its acceleration. Further, it is attracted by the sun of the mass M, due to the **global effective gravitational force**, defined as:

$$F^*_{GEG}(v; p) \equiv -\frac{GMm^*(v;p)}{r^2} = -\frac{GMm\times(1+p\times\frac{v^2}{c^2})}{r^2}, \qquad (3)$$

where r is the distace between the sun and the planet, and G is the universal gravitational constant, noting that the numerical values of M and G are given in Table 1 in Appendix 1.

From Eq. (2), noting that $\frac{dv}{dt} \times dr = vdv$, our **global effective kinetic energy** is defined by:

$$K^*(v; p) \equiv \int F^*_{GEN}(v; p) \times dr = \int m \times \left(1 + p \times \frac{v^2}{c^2}\right) \times vdv = m \times v^2 \times \left[\frac{2+p\times\frac{v^2}{c^2}}{4}\right]. \quad (4)$$

Eq. (4) is reduced to the correct result at the lowest v ($\ll$ c) as: $\frac{m\times v^2}{2}$, given in the non-relativistic case, and at v=c, to: $K_o(p) \equiv m \times c^2 \times \left[\frac{2+p}{4}\right]$, giving rise to a following assumption, by putting: $x=\frac{2+p}{4}$.

If x is known, then p is determined by : p=4x−2.

For example, **(i)** if x=3/4, then p=1, accoding to : $K_o(p = 1) = (\frac{3}{4}) \times mc^2$, **(ii)** if x=1, then p=2, accoding to : $\mathbf{K_o(p = 2) = mc^2}$, in good accordance with that proposed by Einstein in the relativistic case [1], (iii) if x=5/4, then p=3, accoding to : $K_o(p = 3) = (\frac{5}{4}) \times mc^2$, and so on. This assumption is used to determine $K_o(p)$, given in next Tables 2-11 in Appendix 1.

Further, from Eq. (3), our global effective gravitational energy, $U^{*}(v, r; p)$, is defined by:

$$U^{*}(v, r; p) \equiv -\int_{\infty}^{r} F_{GEG}^{*}(v; p) \times dx \equiv -\int_{\infty}^{r} -\frac{GMm^{*}(v;p)}{x^{2}} dx = -\frac{GMm^{*}(v;p)}{r} = -\frac{GMm\times(1+p\times\frac{v^{2}}{c^{2}})}{r},$$

being reduced to the correct result at the lowest v ($\ll$ c) as: $= -\frac{GMm}{r}$, given in the non-relativistic case, and at v=c, to: $-\frac{GMm\times(1+p)}{r}$, given in the relativistic case.

Here, we choose: $r = r_{P}$, being the distance from the planet to the sun at **Aphelion**, and $v_{P} \leq v \leq c$, v_{P} being the planet speed at **Aphelion**, noting that the values of r_{P} and v_{P} are found to be given in Table 1 in Appendix 1.That gives :

$$U^{*}(v; p) = -\frac{GMm\times(1+p\times\frac{v^{2}}{c^{2}})}{r_{P}}, \quad (5)$$

according at v=c to: $U_{o}(p) \equiv= -\frac{GMm\times(1+p)}{r_{P}}$, given in the relativistic case.

Therefore, from Equations (4, 5), the **global effective total enegy**, $E^{*}(v; p)$, is found to be given by:

$$E^{*}(v; p) \equiv m \times v^{2} \times \left[\frac{2+p\times\frac{v^{2}}{c^{2}}}{4}\right] - \frac{GMm\times(1+p\times\frac{v^{2}}{c^{2}})}{r_{P}}, \quad (6)$$

according at v=c to: $E_{o}(p) = K_{o}(p) + U_{o}(p) = m \times v^{2} \times \left[\frac{2+p}{4}\right] - \frac{GMm\times(1+p)}{r_{P}}$.

Furthermore, it is interesting to evaluate the relative errors between $K^{*}(v; p)$ and $E^{*}(v; p)$, defined by:

$$RE(v; p) \equiv 1 - \frac{E^{*}(v;p)}{K^{*}(v;p)}. \quad (7)$$

Then, in following Tables 2-11 in Appendix 1, the numerical results of $RE(v; p)$, $K^{*}(v; p)/K_{o}(p)$, $U^{*}(v; p)/U_{o}(p)$ and $E^{*}(v; p)/E_{o}(p)$ are obtained for p=1, 2 and 3, respectively, using Equations (7, 4, 5, 6), noting that, for a given p, $RE(v; p)$ decreases with increasing v, and at v=c, one obtains $K^{*}(v; p) \cong E^{*}(v; p)$, with highest precision.

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APPENDIX 1

Table 1. The numerical results of the planetary parameters are given by: the rest planet mass, m (Kg), the distance from the planet to the sun at **Aphelion**, $r_P(m)$, and the planet speed at **Aphelion**, $v_P\left(\frac{10^3 \times m}{s}\right)$. Further, the sun mass M, universal gravitational constant G, and light speed c, are found to be given respectively by : $M = 1.988475 \times 10^{30}$ kg, $G = 6.6743 \times 10^{-11} \frac{m^3}{kg \times s^2}$, and $c = 2.9979 \times 10^8 \left(\frac{m}{s}\right)$.

Celestial body	m (Kg)	$r_P(m)$	$v_P\left(\frac{10^3 \times m}{s}\right)$
Mercury	3.30101×10^{23}	6.98173×10^{10}	47.87
Venus	4.86732×10^{24}	1.08940×10^{11}	35.02
Earth	5.97219×10^{24}	1.52096×10^{11}	29.78
Mars	6.41693×10^{23}	2.49233×10^{11}	24.13
Jupiter	1.89852×10^{27}	8.16038×10^{11}	13.06
Saturn	5.68460×10^{26}	1.50724×10^{12}	9.64
Uranus	8.68192×10^{25}	3.01104×10^{12}	6.79
Neptune	1.02431×10^{26}	4.54594×10^{12}	5.43
Pluto	1.46158×10^{22}	7.38868×10^{12}	4.74
Moon	7.34581×10^{22}	4.04689×10^{8}	1.03

Table 2. In the **Mercury-Sun interaction system**, in which the values of m, r_P and v_P are given in Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \le v \le c$.

X(v)=v/c	$RE(v;p)$	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$
Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right) \times mc^2 = 2.22506339 \times 10^{40}$ J, $U_o(p) = -1.25498821 \times 10^{33}$ J and $E_o(p) = 2.22506326 \times 10^{40}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 5.64023577$\times 10^{-8}$.				
0.00015968	**1.65904237**	**1.69984685$\times 10^{-8}$**	**0.50000001**	**-1.12027116$\times 10^{-8}$**
0.09	5.24350608$\times 10^{-6}$	0.00542187	0.50405	0.00542184
0.30	4.90259727$\times 10^{-7}$	0.0627	0.545	0.06269997
0.40	2.83970203$\times 10^{-7}$	0.1152.	0.58	0.11519997
0.60	1.3542939$\times 10^{-7}$	0.2832	0.68	0.28319998
0.80	8.21199099$\times 10^{-8}$	0.5632	0.82	0.56319999
0.90	6.72784152$\times 10^{-8}$	0.7587	0.905	0.75869999
0.95	6.14460178$\times 10^{-8}$	0.87316875	0.95125	0.87316875
1	5.64023577$\times 10^{-8}$	**1**	**1**	**1**
Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 2.96675118 \times 10^{40}}$ **J, in good agreement with that, proposed by Einstein in 1905**, $U_o(p) = -1.88248231 \times 10^{33}$ J and $E_o(p) = 2.96675099 \times 10^{40}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 6.34526522$\times 10^{-8}$.				
0.00015968	**1.65904239**	**1.27488515$\times 10^{-8}$**	**0.33333335**	**-8.40203416$\times 10^{-9}$**
0.09	5.26440239$\times 10^{-6}$	0.00408281	0.33873333	0.00408278
0.30	5.08828608$\times 10^{-7}$	0.04905	0.39333333	0.04904998
0.40	3.00853092$\times 10^{-7}$	0.0928	0.44	0.09279998
0.60	1.48609153$\times 10^{-7}$	0.2448	0.57333333	0.24479998
0.80	9.18902738$\times 10^{-8}$	0.5248	0.76	0.52479999
0.90	7.55955478$\times 10^{-8}$	0.73305	0.87333333	0.73304999
0.95	6.91065974$\times 10^{-8}$	0.85850312	0.935	0.85850312
1	6.34526522$\times 10^{-8}$	**1**	**1**	**1**
Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4} \times mc^2 = 3.70843898 \times 10^{40}$ J,$U_o(p) = -2.50997641 \times 10^{33}$ J and $E_o(p) = 3.70843873 \times 10^{40}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 6.7682529$\times 10^{-8}$.				
0.00015968	**1.65904242**	**1.01990814$\times 10^{-8}$**	**0.25000002**	**-6.72162766$\times 10^{-9}$**
0.09	5.28513147$\times 10^{-6}$	0.00327937	0.256075	0.00327935
0.30	5.25925067$\times 10^{-7}$	0.04086	0.3175	0.04085998
0.40	3.15557545$\times 10^{-7}$	0.07936	0.37	0.07935998
0.60	1.58707933$\times 10^{-7}$	0.22176	0.52	0.22175998

0.80	$9.84703149 \times 10^{-8}$	0.50176	0.73	0.50175998
0.90	$8.08712007 \times 10^{-8}$	0.71766	0.8575	0.71765999
0.95	$7.38298757 \times 10^{-8}$	0.84970375	0.926875	0.84970374
1	6.7682529×10^{-8}	**1**	**1**	**1**

Table 3. In the **Venus-Sun interaction system**, in which the values of m, r_P and v_P are given in above Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \leq v \leq c$.

X(v)=v/c	$RE(v;p)$	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$

Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right) \times mc^2 = 3.28084299 \times 10^{41}$ J, $U_o(p) = -1.18592816 \times 10^{34}$ J and $E_o(p) = 3.28084287 \times 10^{41}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of $3.61470563 \times 10^{-8}$.

0.00011682	**1.98655136**	$\mathbf{9.09794166 \times 10^{-9}}$	**0.50000001**	$\mathbf{-8.97558708 \times 10^{-9}}$
0.09	$3.36045013 \times 10^{-6}$	0.00542187	0.50405	0.00542185
0.30	$3.14196901 \times 10^{-7}$	0.0627	0.545	0.06269998
0.40	$1.81990388 \times 10^{-7}$	0.1152	0.58	0.11519998
0.60	$8.67937794 \times 10^{-8}$	0.2832	0.68	0.28319999
0.80	$5.26288817 \times 10^{-8}$	0.5632	0.82	0.56319999
0.90	$4.31172874 \times 10^{-8}$	0.7587	0.905	0.75869999
0.95	$3.93794296 \times 10^{-8}$	0.87316875	0.95125	0.87316875
1	$3.61470563 \times 10^{-8}$	**1**	**1**	**1**

Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 4.37445732 \times 10^{41}}$ **J, in good agreement with that, proposed by Einstein in 1905**, $U_o(p) = -1.77889225 \times 10^{34}$ J and $E_o(p) = 4.37445715 \times 10^{41}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of $4.06654384 \times 10^{-8}$.

0.00011682	**1.98655138**	$\mathbf{6.82345629 \times 10^{-9}}$	**0.33333334**	$\mathbf{-6.73169048 \times 10^{-9}}$
0.09	$3.37384212 \times 10^{-6}$	0.00408280	0.33873333	0.00408279
0.30	$3.26097297 \times 10^{-7}$	0.04905	0.39333333	0.04904999
0.40	$1.92810268 \times 10^{-7}$	0.0928	0.44	0.09279999
0.60	$9.52404057 \times 10^{-8}$	0.2448	0.57333333	0.24479999
0.80	$5.88904977 \times 10^{-8}$	0.5248	0.76	0.52479999
0.90	$4.84475586 \times 10^{-8}$	0.73305	0.87333333	0.73304999
0.95	$4.42889301 \times 10^{-8}$	0.85850312	0.935	0.85850312
1	$4.06654384 \times 10^{-8}$	**1**	**1**	**1**

Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4} \times mc^2 = 5.46807165 \times 10^{41}$ J,$U_o(p) = -2.37185633 \times 10^{34}$ J and $E_o(p) = 5.46807142 \times 10^{41}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of $4.33764676 \times 10^{-8}$.

0.00011682	**1.98655139**	**5.45876507$\times 10^{-9}$**	**0.25000001**	**-5.38535251$\times 10^{-9}$**
0.09	3.38712695$\times 10^{-6}$	0.00327937	0.256075	0.00327936
0.30	3.37054049$\times 10^{-7}$	0.04086	0.3175	0.04085999
0.40	2.02234035$\times 10^{-7}$	0.07936	0.37	0.07935999
0.60	1.01712496$\times 10^{-7}$	0.22176	0.52	0.22175999
0.80	6.31075043$\times 10^{-8}$	0.50176	0.73	0.50175999
0.90	5.1828611$\times 10^{-8}$	0.71766	0.8575	0.71765999
0.95	4.73159774$\times 10^{-8}$	0.84970375	0.926875	0.84970375
1	4.33764676$\times 10^{-8}$	**1**	**1**	**1**

Table 4. In the **Earth-Sun interaction system**, in which the values of m, r_P and v_P are given in above Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \le v \le c$.

X(v)=v/c	$RE(v;p)$	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$
Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right) \times mc^2 = 4.02558651 \times 10^{41}$ J, $U_o(p) = -1.04224946 \times 10^{34}$ J and $E_o(p) = 4.0255864 \times 10^{41}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 2.58906238$\times 10^{-8}$.				
9.9336×10^{-5}	**1.96783498**	**6.57845405$\times 10^{-9}$**	**0.50**	**-6.36685814$\times 10^{-9}$**
0.09	2.4069498$\times 10^{-6}$	0.00542187	0.50405	0.00542186
0.30	2.25046092$\times 10^{-7}$	0.0627	0.545	0.06269999
0.40	1.30352099$\times 10^{-7}$	0.1152	0.58	0.11519999
0.60	6.21667521$\times 10^{-8}$	0.2832	0.68	0.28319999
0.80	3.76958657$\times 10^{-8}$	0.5632	0.82	0.56319999
0.90	3.08831086$\times 10^{-8}$	0.7587	0.905	0.7587
0.95	2.82058374$\times 10^{-8}$	0.87316875	0.95125	0.87316875
1	2.58906238$\times 10^{-8}$	**1**	**1**	**1**
Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 5.36744867 \times 10^{41}}$ **J, in good agreement with that, proposed by Einstein in 1905**, $U_o(p) = -1.56337419 \times 10^{34}$ J and $E_o(p) = 5.36744852 \times 10^{41}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 2.91269519$\times 10^{-8}$.				
9.9336×10^{-5}	**1.96783499**	**4.93384056$\times 10^{-9}$**	**0.33333334**	**-4.75514369$\times 10^{-9}$**
0.09	2.41654193$\times 10^{-6}$	0.00408281	0.33873333	0.0040828
0.30	2.33569848$\times 10^{-7}$	0.04905	0.39333333	0.04904999
0.40	1.38101927$\times 10^{-7}$	0.0928	0.44	0.09279999
0.60	6.82167172$\times 10^{-8}$	0.2448	0.57333333	0.24479999
0.80	4.21807991$\times 10^{-8}$	0.5248	0.76	0.52479999
0.90	3.47009589$\times 10^{-8}$	0.73305	0.87333333	0.73305
0.95	3.17223072$\times 10^{-8}$	0.85850312	0.935	0.85850312

1	2.91269519×10^{-8}	**1**	**1**	**1**

Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4} \times mc^2 = 6.70931084 \times 10^{41}$ J,$U_o(p) = -2.08449892 \times 10^{34}$ J and $E_o(p) = 6.70931063 \times 10^{41}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 3.21239455×10^{-8}.

$\mathbf{9.9336 \times 10^{-5}}$	**1.96783500**	$\mathbf{3.94707247\times 10^{-9}}$	**0.25000001**	$\mathbf{-3.82011502\times 10^{-9}}$
0.09	2.42605729×10^{-6}	0.00327937	0.256075	0.00327936
0.30	2.41417711×10^{-7}	0.04086	0.3175	0.04085999
0.40	1.44851776×10^{-7}	0.07936	0.37	0.07935999
0.60	7.28524046×10^{-8}	0.22176	0.52	0.22175999
0.80	4.52012645×10^{-8}	0.50176	0.73	0.50175999
0.90	3.71226653×10^{-8}	0.71766	0.8575	0.71766
0.95	3.38904546×10^{-8}	0.84970375	0.926875	0.84970375
1	3.10687486×10^{-8}	**1**	**1**	**1**

Table 5. In the **Mars-Sun interaction system**, in which the values of m, r_P and v_P are given in above Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \leq v \leq c$.

X(v)=v/c	$RE(v;p)$	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$

Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right) \times mc^2 = 4.32536587 \times 10^{40}$ J, $U_o(p) = -6.83404149 \times 10^{32}$ J and $E_o(p) = 4.32536581 \times 10^{40}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 1.57999155×10^{-8}.

$\mathbf{8.0490 \times 10^{-5}}$	**1.82909249**	$\mathbf{4.31905865\times 10^{-9}}$	**0.50**	$\mathbf{-3.58089916\times 10^{-9}}$
0.09	1.4688562×10^{-6}	0.00542187	0.50405	0.00542186
0.30	1.37335788×10^{-7}	0.0627	0.545	0.06269999
0.40	7.95481853×10^{-8}	0.1152	0.58	0.11519999
0.60	3.79376499×10^{-8}	0.2832	0.68	0.28319999
0.80	2.30041383×10^{-8}	0.5632	0.82	0.5632
0.90	1.88466105×10^{-8}	0.7587	0.905	0.7587
0.95	1.72127891×10^{-8}	0.87316875	0.95125	0.87316875
1	1.57999155×10^{-8}	**1**	**1**	**1**

Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 5.7671545 \times 10^{40}}$ **J, in good agreement with that, proposed by Einstein in 1905**, $U_o(p) = -1.02510622 \times 10^{33}$ J and $E_o(p) = 5.7671544 \times 10^{40}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 1.77749048×10^{-8}.

$\mathbf{8.0490 \times 10^{-5}}$	**1.8290925**	$\mathbf{3.239294\times 10^{-9}}$	**0.33333334**	$\mathbf{-2.6856744\times 10^{-9}}$
0.09	1.47470985×10^{-6}	0.00408281	0.33873333	0.0040828
0.30	1.42537463×10^{-7}	0.04905	0.39333333	0.04904999

0.40	8.42775660×10^{-8}	0.0928	0.44	0.09279999
0.60	4.1629679×10^{-8}	0.2448	0.57333333	0.24479999
0.80	2.57410969×10^{-8}	0.5248	0.76	0.5248
0.90	2.11764776×10^{-8}	0.73305	0.87333333	0.73305
0.95	1.93587368×10^{-8}	0.85850312	0.935	0.85850312
1	1.77749048×10^{-8}	**1**	**1**	**1**

Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4}\times mc^2 = 7.20894312 \times 10^{40}$ J,$U_o(p) = -1.3668083 \times 10^{33}$ J and $E_o(p) = 7.20894299 \times 10^{40}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 1.89598985×10^{-8}.

$\mathbf{8.0490 \times 10^{-5}}$	**1.8290925**	$\mathbf{2.59143521\times 10^{-9}}$	**0.25**	$\mathbf{-2.14853955\times 10^{-9}}$
0.09	1.48051666×10^{-6}	0.00327937	0.256075	0.00327936
0.30	1.47326671×10^{-7}	0.04086	0.3175	0.04085999
0.40	8.83967041×10^{-8}	0.07936	0.37	0.07935999
0.60	4.44586364×10^{-8}	0.22176	0.52	0.22175999
0.80	2.75843549×10^{-8}	0.50176	0.73	0.50176
0.90	2.26543391×10^{-8}	0.71766	0.8575	0.71766
0.95	2.06818623×10^{-8}	0.84970375	0.926875	0.84970375
1	1.89598985×10^{-8}	**1**	**1**	**1**

Table 6. In the **Jupiter-Sun interaction system**, in which the values of m, r_P and v_P are given in above Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \leq v \leq c$.

X(v)=v/c	$RE(v;p)$	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$

Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right) \times mc^2 = 1.27970753 \times 10^{44}$ J, $U_o(p) = -6.17533679 \times 10^{35}$ J and $E_o(p) = 1.27970752 \times 10^{44}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 4.82558449×10^{-9}.

$\mathbf{4.3564 \times 10^{-5}}$	**1.9070370**	$\mathbf{1.26520474\times 10^{-9}}$	**0.50**	$\mathbf{-1.14758751\times 10^{-9}}$
0.09	4.48615674×10^{-7}	0.00542187	0.50405	0.00542187
0.30	4.19448732×10^{-8}	0.0627	0.545	0.0627
0.40	2.42954775×10^{-8}	0.1152	0.58	0.1152
0.60	1.15868555×10^{-8}	0.2832	0.68	0.2832
0.80	7.02588654×10^{-9}	0.5632	0.82	0.5632
0.90	5.75610104×10^{-9}	0.7587	0.905	0.7587
0.95	5.25710209×10^{-9}	0.87316875	0.95125	0.87316875
1	4.82558449×10^{-9}	**1**	**1**	**1**

Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 1.7062767 \times 10^{44}}$ **J**, in good agreement with that, proposed by **Einstein in 1905**, $U_o(p) = -9.26300519 \times 10^{35}$ J and $E_o(p) = 1.70627669 \times 10^{44}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 5.42878253×10^{-9}.

$\mathbf{4.3564 \times 10^{-5}}$	**1.907037**	**9.48903557**$\times$ $\mathbf{10^{-10}}$	**0.33333333**	**-8.60690639**$\times$ $\mathbf{10^{-9}}$
0.09	4.50403487$\times 10^{-7}$	0.0040828	0.33873333	0.0040828
0.30	4.35335604$\times 10^{-8}$	0.04905	0.39333333	0.04905
0.40	2.57399173$\times 10^{-8}$	0.0928	0.44	0.0928
0.60	1.27144689$\times 10^{-8}$	0.2448	0.57333333	0.2448
0.80	7.86180399$\times 10^{-9}$	0.5248	0.76	0.5248
0.90	6.46768539$\times 10^{-9}$	0.73305	0.87333333	0.73305
0.95	5.91251392$\times 10^{-9}$	0.85850312	0.935	0.85850312
1	5.42878253$\times 10^{-9}$	**1**	**1**	**1**

Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4} \times mc^2 = 2.13284588 \times 10^{44}$ J,$U_o(p) = -1.23506736 \times 10^{36}$ J and $E_o(p) = 2.13284587 \times 10^{44}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 5.79070136×10^{-9}.

$\mathbf{4.3564 \times 10^{-5}}$	**1.907037**	**7.59122846**$\times$ $\mathbf{10^{-10}}$	**0.25**	**-6.88552513**$\times$ $\mathbf{10^{-10}}$
0.09	4.52176993$\times 10^{-7}$	0.00327937	0.256075	0.00327936
0.30	4.49962725$\times 10^{-8}$	0.04086	0.3175	0.04086
0.40	2.69979777$\times 10^{-8}$	0.07936	0.37	0.07936
0.60	1.35784844$\times 10^{-8}$	0.22176	0.52	0.22176
0.80	8.42476888$\times 10^{-9}$	0.50176	0.73	0.50176
0.90	6.91905144$\times 10^{-9}$	0.71766	0.8575	0.71766
0.95	6.31662078$\times 10^{-9}$	0.84970375	0.926875	0.84970375
1	5.79070136$\times 10^{-9}$	**1**	**1**	**1**

Table 7. In the **Saturn-Sun interaction system**, in which the values of m, r_P and v_P are given in above Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \leq v \leq c$.

X(v)=v/c	$RE(v;p)$	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$

Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right) \times mc^2 = 3.83173493 \times 10^{43}$ J, $U_o(p) = -1.00109053 \times 10^{35}$ J and $E_o(p) = 3.83173492 \times 10^{43}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 2.61262989×10^{-9}.

$\mathbf{3.2156 \times 10^{-5}}$	**1.89504434**	**6.89332134**$\times$ $\mathbf{10^{-10}}$	**0.50**	**-6.89332134**$\times$ $\mathbf{10^{-10}}$
0.09	2.42885962$\times 10^{-7}$	0.00542187	0.50405	0.00542187
0.30	2.27094625$\times 10^{-8}$	0.0627	0.545	0.0627
0.40	1.31538659$\times 10^{-8}$	0.1152	0.58	0.1152
0.60	6.27326391$\times 10^{-9}$	0.2832	0.68	0.2832

0.80	3.80390008×10^{-9}	0.5632	0.82	0.5632
0.90	3.1164229×10^{-9}	0.7587	0.905	0.7587
0.95	2.84625867×10^{-9}	0.87316875	0.95125	0.87316875
1	2.61262989×10^{-9}	**1**	**1**	**1**

Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 5.10897991 \times 10^{43}}$ **J**, in good agreement with that, proposed by **Einstein in 1905**, $U_o(p) = -1.5016358 \times 10^{35}$ J and $E_o(p) = 5.10897990 \times 10^{43}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 2.93920877×10^{-9}.

$\mathbf{3.2156\times 10^{-5}}$	**1.89504434**	$\mathbf{5.16999101\times 10^{-10}}$	**0.33333333**	$\mathbf{-4.62737122\times 10^{-10}}$
0.09	2.43853906×10^{-7}	0.00408281	0.33873333	0.0040828
0.30	2.35695971×10^{-8}	0.04905	0.39333333	0.04905
0.40	1.39359031×10^{-8}	0.0928	0.44	0.0928
0.60	6.88376756×10^{-8}	0.2448	0.57333333	0.2448
0.80	4.25647595×10^{-9}	0.5248	0.76	0.5248
0.90	3.50168328×10^{-9}	0.73305	0.87333333	0.73305
0.95	3.2011066×10^{-9}	0.85850312	0.935	0.85850312
1	2.93920877×10^{-9}	**1**	**1**	**1**

Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4} \times mc^2 = 6.38622489 \times 10^{43}$ J,$U_o(p) = -2.00218106 \times 10^{35}$ J and $E_o(p) = 6.38622487 \times 10^{43}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 3.13515580×10^{-9}.

$\mathbf{3.2156\times 10^{-5}}$	**1.89504434**	$\mathbf{4.13599281\times 10^{-10}}$	**0.25**	$\mathbf{-3.70189698\times 10^{-10}}$
0.09	2.44814103×10^{-7}	0.00327937	0.256075	0.00327937
0.30	2.43615271×10^{-8}	0.04086	0.3175	0.04086
0.40	1.46170324×10^{-8}	0.07936	0.37	0.07936
0.60	7.35155614×10^{-9}	0.22176	0.52	0.22176
0.80	4.56127192×10^{-9}	0.50176	0.73	0.50176
0.90	3.74605824×10^{-9}	0.71766	0.8575	0.71766
0.95	3.41989503×10^{-9}	0.84970375	0.926875	0.84970375
1	3.13515580×10^{-9}	**1**	**1**	**1**

Table 8. In the **Uranus-Sun interaction system**, in which the values of m, r_P and v_P are given in above Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \le v \le c$.

X(v)=v/c	RE(v; p)	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$
Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right) \times mc^2 = 5.85209446 \times 10^{42}$ J, $U_o(p) = -7.65341229 \times 10^{33}$ J and $E_o(p) = 5.85209445 \times 10^{42}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 1.30780731$\times 10^{-9}$.				
$\mathbf{2.2649 \times 10^{-5}}$	**1.91205236**	**3.41990472**$\times \mathbf{10^{-10}}$	**0.50**	**-3.11913216**$\times \mathbf{10^{-10}}$
0.09	1.21581725$\times 10^{-7}$	0.00542187	0.50405	0.00542187
0.30	1.13677036$\times 10^{-8}$	0.0627	0.545	0.0627
0.40	6.58444688$\times 10^{-9}$	0.1152	0.58	0.1152
0.60	3.14021542$\times 10^{-9}$	0.2832	0.68	0.2832
0.80	1.90412297$\times 10^{-9}$	0.5632	0.82	0.5632
0.90	1.55999169$\times 10^{-9}$	0.7587	0.905	0.7587
0.95	1.42475531$\times 10^{-9}$	0.87316875	0.95125	0.87316875
1	1.30780731$\times 10^{-9}$	**1**	**1**	**1**
Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 7.80279261 \times 10^{42}}$ **J**, in good agreement with that, proposed by **Einstein in 1905**, $U_o(p) = -1.14801184 \times 10^{34}$ J and $E_o(p) = 7.80279260 \times 10^{42}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 1.47128332$\times 10^{-9}$.				
$\mathbf{2.2649 \times 10^{-5}}$	**1.91205236**	**2.56492854**$\times \mathbf{10^{-10}}$	**0.33333333**	**-2.33934912**$\times \mathbf{10^{-10}}$
0.09	1.2206625$\times 10^{-7}$	0.00408281	0.33873333	0.0040828
0.30	1.17982623$\times 10^{-8}$	0.04905	0.39333333	0.04905
0.40	6.97591229$\times 10^{-9}$	0.0928	0.44	0.0928
0.60	3.44581608$\times 10^{-9}$	0.2448	0.57333333	0.2448
0.80	2.13066942$\times 10^{-9}$	0.5248	0.76	0.5248
0.90	1.75284187$\times 10^{-9}$	0.73305	0.87333333	0.73305
0.95	1.60238189$\times 10^{-9}$	0.85850312	0.935	0.85850312
1	1.47128332$\times 10^{-9}$	**1**	**1**	**1**
Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4} \times mc^2 = 9.75349076 \times 10^{42}$ J, $U_o(p) = -1.53068246 \times 10^{34}$ J and $E_o(p) = 9.75349075 \times 10^{42}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 1.56936875$\times 10^{-9}$.				
$\mathbf{2.2649 \times 10^{-5}}$	**1.91205236**	**2.05194283**$\times \mathbf{10^{-10}}$	**0.25**	**-1.8714793**$\times \mathbf{10^{-10}}$
0.09	1.22546897$\times 10^{-7}$	0.00327937	0.256075	0.00327937
0.30	1.21946795$\times 10^{-8}$	0.04086	0.3175	0.04086
0.40	7.31686589$\times 10^{-8}$	0.07936	0.37	0.07936
0.60	3.67997743$\times 10^{-9}$	0.22176	0.52	0.22176

0.80	2.28324148×10^{-9}	0.50176	0.73	0.50176
0.90	1.87516902×10^{-9}	0.71766	0.8575	0.71766
0.95	1.71190107×10^{-9}	0.84970375	0.926875	0.84970375
1	1.56936875×10^{-9}	**1**	**1**	**1**

Table 9. In the **Neptune-Sun interaction system**, in which the values of m, r_P and v_P are given in above Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \le v \le c$.

X(v)=v/c	$RE(v;p)$	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$
Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right) \times mc^2 = 6.90441616 \times 10^{42}$ J, $U_o(p) = -5.98085905 \times 10^{33}$ J and $E_o(p) = 6.90441615 \times 10^{42}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of $8.66236638\times 10^{-10}$.				
$\mathbf{1.8113 \times 10^{-5}}$	**1.98030687**	$\mathbf{2.18712758\times 10^{-10}}$	**0.50**	$\mathbf{-2.1440562\times 10^{-10}}$
0.09	8.05306355×10^{-8}	0.00542187	0.50405	0.00542187
0.30	7.52949003×10^{-9}	0.0627	0.545	0.0627
0.40	4.36126157×10^{-9}	0.1152	0.58	0.1152
0.60	2.0799471×10^{-9}	0.2832	0.68	0.2832
0.80	1.26121114×10^{-9}	0.5632	0.82	0.5632
0.90	1.03327302×10^{-9}	0.7587	0.905	0.7587
0.95	$9.43698231\times 10^{-10}$	0.87316875	0.95125	0.87316875
1	$8.66236638\times 10^{-10}$	**1**	**1**	**1**
Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 9.20588821 \times 10^{42}}$ **J**, in good agreement with that, proposed by **Einstein in 1905**, $U_o(p) = -8.97128858 \times 10^{33}$ J and $E_o(p) = 9.20588820 \times 10^{42}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of $9.74516357\times 10^{-10}$.				
$\mathbf{1.8113 \times 10^{-5}}$	**1.98030687**	$\mathbf{1.64034569\times 10^{-10}}$	**0.33333333**	$\mathbf{-1.60804215\times 10^{-10}}$
0.09	8.08515644×10^{-8}	0.00408281	0.33873333	0.0040828
0.30	7.81467413×10^{-9}	0.04905	0.39333333	0.04905
0.40	4.62055161×10^{-9}	0.0928	0.44	0.0928
0.60	2.28236396×10^{-9}	0.2448	0.57333333	0.2448
0.80	1.4112661×10^{-9}	0.5248	0.76	0.5248
0.90	1.16100884×10^{-9}	0.73305	0.87333333	0.73305
0.95	1.06135067×10^{-9}	0.85850312	0.935	0.85850312
1	$9.74516357\times 10^{-10}$	**1**	**1**	**1**
Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4} \times mc^2 = 1.150736030 \times 10^{43}$ J, $U_o(p) = -1.19617181 \times 10^{34}$ J and $E_o(p) = 1.150736025 \times 10^{43}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 1.03948405×10^{-9}.				

1.8113×10^{-5}	**1.98030687**	**1.31227655$\times 10^{-10}$**	**0.25**	**-1.28643372$\times 10^{-10}$**
0.09	8.11699251$\times 10^{-8}$	0.00327937	0.256075	0.00327937
0.30	8.07724443$\times 10^{-9}$	0.04086	0.3175	0.04086
0.40	4.84638507$\times 10^{-9}$	0.07936	0.37	0.07936
0.60	2.43746279$\times 10^{-9}$	0.22176	0.52	0.22176
0.80	1.51232338$\times 10^{-9}$	0.50176	0.73	0.50176
0.90	1.24203337$\times 10^{-9}$	0.71766	0.8575	0.71766
0.95	1.13389143$\times 10^{-9}$	0.84970375	0.926875	0.84970375
1	1.03948405$\times 10^{-9}$	**1**	**1**	**1**

Table 10. In the **Pluto-Sun interaction system**, in which the values of m, r_P and v_P are given in above Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \le v \le c$.

X(v)=v/c	$RE(v;p)$	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$
Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right) \times mc^2 = 9.851857903 \times 10^{38}$ J, $U_o(p) = -5.25063209 \times 10^{29}$ J and $E_o(p) = 9.851857898 \times 10^{38}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 5.32958566$\times 10^{-10}$.				
1.5811×10^{-5}	**1.59894055**	**1.66659908$\times 10^{-10}$**	**0.50**	**-9.98193766$\times 10^{-11}$**
0.09	4.95470689$\times 10^{-8}$	0.00542187	0.50405	0.00542187
0.30	4.63257444$\times 10^{-9}$	0.0627	0.545	0.0627
0.40	2.68329836$\times 10^{-9}$	0.1152	0.58	0.1152
0.60	1.27970279$\times 10^{-9}$	0.2832	0.68	0.2832
0.80	7.75969511$\times 10^{-10}$	0.5632	0.82	0.5632
0.90	6.35728914$\times 10^{-10}$	0.7587	0.905	0.7587
0.95	5.80617221$\times 10^{-10}$	0.87316875	0.95125	0.87316875
1	5.32958566$\times 10^{-10}$	**1**	**1**	**1**
Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 1.313581054 \times 10^{39}}$ **J**, in good agreement with that, proposed by **Einstein in 1905**, $U_o(p) = -7.87594813 \times 10^{29}$ J and $E_o(p) = 1.313581053 \times 10^{39}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 5.99578387$\times 10^{-10}$.				
1.5811×10^{-5}	**1.59894055**	**1.24994931$\times 10^{-10}$**	**0.33333333**	**-7.48645325$\times 10^{-11}$**
0.09	4.97445228$\times 10^{-8}$	0.00408281	0.33873333	0.0040828
0.30	4.80803597$\times 10^{-9}$	0.04905	0.39333333	0.04905
0.40	2.84282864$\times 10^{-9}$	0.0928	0.44	0.0928
0.60	1.40424128$\times 10^{-9}$	0.2448	0.57333333	0.2448
0.80	8.68291994$\times 10^{-10}$	0.5248	0.76	0.5248
0.90	7.14319381$\times 10^{-10}$	0.73305	0.87333333	0.73305
0.95	6.53003762$\times 10^{-10}$	0.85850312	0.935	0.85850312

1	$5.99578387\times 10^{-10}$	**1**	**1**	**1**

Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4}\times mc^2 = 1.6419763170\times 10^{39}$ J, $U_o(p) = -1.05012642\times 10^{30}$ J and $E_o(p) = 1.6419763161\times 10^{39}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of $6.39550302\times 10^{-10}$.

$\mathbf{1.5811\times 10^{-5}}$	**1.59894055**	$\mathbf{9.99959448\times 10^{-11}}$	**0.25**	$\mathbf{-5.9891626\times 10^{-11}}$
0.09	4.99403965×10^{-8}	0.00327937	0.256075	0.00327937
0.30	4.9695843×10^{-9}	0.04086	0.3175	0.04086
0.40	2.98177427×10^{-9}	0.07936	0.37	0.07936
0.60	1.49966695×10^{-9}	0.22176	0.52	0.22176
0.80	$9.30468147\times 10^{-10}$	0.50176	0.73	0.50176
0.90	$7.64170172\times 10^{-10}$	0.71766	0.8575	0.71766
0.95	$6.97635061\times 10^{-10}$	0.84970375	0.926875	0.84970375
1	$6.39550302\times 10^{-10}$	**1**	**1**	**1**

Table 11. In the **Moon-Sun interaction system**, in which the values of m, r_P and v_P are given in above Table 1, the numerical results of $RE(v;p)$, $K^*(v;p)/K_o(p)$, $U^*(v;p)/U_o(p)$ and $E^*(v;p)/E_o(p)$, are obtained by using Equations (7, 4, 5, 6), respectively, noting that $v_P \le v \le c$.

X(v)=v/c	$RE(v;p)$	$K^*(v;p)/K_o(p)$	$U^*(v;p)/U_o(p)$	$E^*(v;p)/E_o(p)$
Here, for **p=1** and at v=c, $K_o(p) = \left(\frac{3}{4}\right)\times mc^2 = 4.95148239\times 10^{39}$ J, $U_o(p) = -4.81808154\times 10^{34}$ J and $E_o(p) = 4.95143421\times 10^{39}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 9.73058402×10^{-6}.				
$\mathbf{3.4357\times 10^{-6}}$	$\mathbf{6.18244135\times 10^{5}}$	$\mathbf{7.86953201\times 10^{-12}}$	**0.50**	$\mathbf{-4.86533148\times 10^{-6}}$
0.09	0.00090461	0.00542187	0.50405	0.00541702
0.30	8.45800366×10^{-5}	0.0627	0.545	0.06269531
0.40	4.89907876×10^{-5}	0.1152	0.58	0.11519548
0.60	2.33643967×10^{-5}	0.2832	0.68	0.28319614
0.80	1.41673986×10^{-5}	0.5632	0.82	0.5631975
0.90	1.1606931×10^{-5}	0.7587	0.905	0.75869858
0.95	1.06007007×10^{-5}	0.87316875	0.95125	0.87316799
1	9.73058402×10^{-6}	**1**	**1**	**1**
Here, for **p=2** and at v=c, $\mathbf{K_o(p) = mc^2 = 6.60197652\times 10^{39}}$ **J**, in good agreement with that, proposed by **Einstein in 1905**, $U_o(p) = -7.22712231\times 10^{34}$ J and $E_o(p) = 6.60190425\times 10^{39}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 1.0946907×10^{-5}.				
$\mathbf{3.4357\times 10^{-6}}$	$\mathbf{6.18244135\times 10^{5}}$	$\mathbf{5.90214900\times 10^{-12}}$	**0.33333333**	$\mathbf{-3.64900305\times 10^{-6}}$
0.09	0.00090822	0.00408281	0.33873333	0.00407914
0.30	8.77835562×10^{-5}	0.04905	0.39333333	0.04904623

0.40	5.19034385×10^{-5}	0.0928	0.44	0.0927962
0.60	2.56381809×10^{-5}	0.2448	0.57333333	0.2447964
0.80	1.58529904×10^{-5}	0.5248	0.76	0.52479743
0.90	1.304181×10^{-5}	0.73305	0.87333333	0.73304846
0.95	1.19223306×10^{-5}	0.85850312	0.935	0.85850229
1	1.0946907×10^{-5}	**1**	**1**	**1**

Here, for **p=3** and further at v=c, $K_o(p) = \frac{5}{4} \times mc^2 = 8.25247065 \times 10^{39}$ J,$U_o(p) = -9.63616308 \times 10^{34}$ J and $E_o(p) = 8.25237429 \times 10^{39}$ J, suggesting that $E_o(p) \cong K_o(p)$, with a precision of the order of 1.16767008×10^{-5}. NY

$\mathbf{3.4357 \times 10^{-6}}$	$\mathbf{6.18244135\times 10^{5}}$	$\mathbf{4.72171920\times 10^{-12}}$	**0.25**	$\mathbf{-2.91920457\times 10^{-6}}$
0.09	0.0009118	0.00327937	0.256075	0.00327641
0.30	9.07330522×10^{-5}	0.04086	0.3175	0.04085677
0.40	5.44402634×10^{-5}	0.07936	0.37	0.07935661
0.60	2.73804312×10^{-5}	0.22176	0.52	0.22175652
0.80	1.69881848×10^{-5}	0.50176	0.73	0.50175733
0.90	1.39519702×10^{-5}	0.71766	0.8575	0.71765837
0.95	1.27371947×10^{-5}	0.84970375	0.926875	0.84970285
1	1.16767008×10^{-5}	**1**	**1**	**1**