

## **Inertia is not always the measure of a mass of a body.**

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### **Abstract**

**Here I am solving the problem of the confused concept of inertia that exists in physics there are 400 years. I show it in this theory of the RELATIVISTIC INERTIA OF THE INVARIANT MASS.**

Mass is the name of the amount of matter in a body. The resistance that the mass presents to leave its rest or to modify its speed is called inertia. In order to overcome (to win) inertia, there must be a force.

The mass is invariant, it does not change. For 400 years physics teaches that inertia (resistance to movement) also does not change because the mass does not change. This concept is not true! If the inertia is the resistance of the mass to leave the rest or to modify its speed, there are two cases in which the resistance or inertia varies without varying the mass.

**First case:** The inertia or resistance of the mass varies when the same mass changes its gravitational location. GRI: Gravitational Relativistic Inertia

If a body, perhaps a clock, has mass  $m$  1 kg at sea level, its weight is 1Kgf because the formula is  $W = m \cdot g$  ... or  $W = 1 \cdot 9,81$  ... or  $W = 9,81N$ . However, if we place the same clock in another gravitational location, for example, at an altitude of 35,700 km (satellite orbit), at this altitude the gravity is  $g = 0.225$ , and The calculation will be  $W = mg$  .. or  $W = 1 \cdot 0.225$  ... or  $W = 0.225N$  or  $P = 0.225kgf$ .

We understand that the 1kg mass has not changed, but has changed the resistance (or inertia) to move it, that is, at the altitude 35,700 km the same mass of the clock will need a force 43.6 times lower than if it were at sea level . We know that weight is not mass, however, varying gravity will only vary the

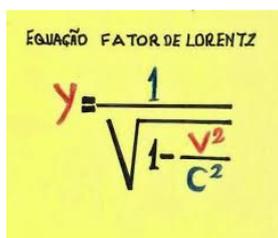
weight and thus will mathematically vary the resistance or inertia without varying the mass.

This new theory that I present to the physicists I call it as RELATIVISTIC INERTIA OF THE INVARIANT MASS. We can understand as,  $GRI = mg$  (Gravitational Relativistic Inertia is equal mass multiplied by gravity or  $IRG = W$ , that is, Gravitational Relativistic Inertia is equal to weight.) Note the altitude table (km) and gravity variation  $g$  ( $m / s^2$ ) =

Sea level 0 km =  $g$  9.81 ... 5000km =  $g$  3.08 ... 10000km =  $g$  1.49 ... 35700km =  $g$  0.225.

**Second case:** The inertia or resistance of the mass varies when the same mass is in motion. RKI: Relative Kinetic Inertia

If the mass is at rest the velocity is zero and the kinetic energy is zero. If the mass is in motion, the higher the velocity, the higher the kinetic energy. The mass does not change, it will always be invariable, but because of the motion, the higher the velocity the greater the kinetic energy. If the mass  $m$  1kg is a clock in flight, the formula for low speeds is  $ke = m.v^2 / 2$ . For high speeds the calculation is made by the Lorentz equation which will show by relativity  $v / c$  the Lorentz factor gamma ( $\gamma$ ) as an indicator of kinetic energy. Einstein taught that energy has inertia. Increasing  $V$  increases  $ke$  and increases the resistance. The calculation is  $RKI = m.\gamma$  (Relative Kinetic Inertia is equal mass multiplied by  $\gamma$  (range) of Lorentz).



Equation FATOR DE LORENTZ

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

**“ENERGY ALSO HAS INERTIA AS MATTER”** (*Einstein*)

**THE RELATIVISTIC INERTIA OF THE INVARIANT MASS IS THE CAUSE OF THE WATCHES' PARADOX IN CASE OF THE GRAVITY OR DUE KINETIC ENERGY.**  
(*Nillo Gallindo*)

**IF IT IS RKI, WITH HIGH SPEED THERE IS GREATER THE INERTIA, GREATER RESISTANCE AND THE CLOCK WORKS MORE SLOW. IF IT IS RGI, WITH LESS GRAVITY WILL BE LESS RESISTANCE AND THE CLOCK WILL ROTATE FASTER.**

**In all cases the mass will always be invariant, but the inertia always relativistic due to gravity or the kinetic energy of motion.**