

NEWTON'S INACURASY

Abstract

This paper demonstrates that blunder with N hypothesis has much older origin and this origin could be located in Newton's work. There will be shown that there is conceptual indetermination of the referential point for velocity determination.

INTRODUCTION

The third Newton's law is very simple as it will be shown in the following text. This law is commonly known in the following form:

$$\vec{F} = m \cdot \vec{a} \quad (1)$$

Whereas:

$\vec{F}$ = force acting to a body that produce acceleration,
 m = mass of the body,
 $\vec{a}$ = acceleration of the body caused by the force.

But, basic definition of acceleration is given as second time derivative of the radius vector:

$$\vec{a} = \frac{d^2 \vec{r}}{dt^2} \quad (2)$$

Or, more precisely, acceleration is variation of radius vector between two points 1 and 2 respectively:

$$\vec{a}_{1,2} = \frac{d^2 \vec{r}_{1,2}}{dt^2} \quad (3)$$

Finally, equation (1) according (3) becomes:

$$\vec{F}_{1,2} = m_1 \cdot \frac{d^2 \vec{r}_{1,2}}{dt^2} \quad (4)$$

So, we know now that one end of the radius vector is pointed into the mass which accelerates and another direction should be pointed somewhere, but where exactly that question is now!?

Let us explain this controversy more descriptively on the following image:

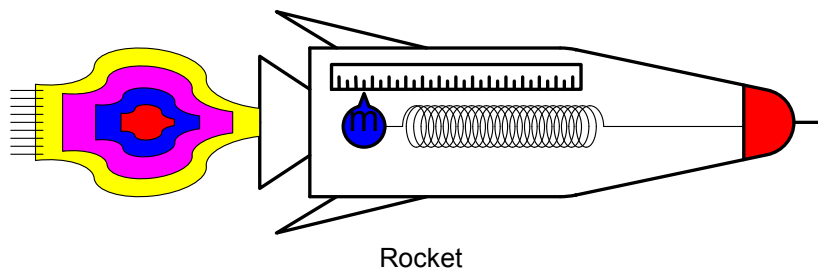


Fig. 1

Above picture shows a rocket with an accelerometer: the accelerometer is consisted of a small mass attached to a spring. Such accelerometer measures acceleration according compression of the spring and we do not have to have another referential point available as we need in the case of velocity's measurement – there we are dealing with road and with a vehicle and the velocity is measuring between the road and the vehicle precisely. If we want to avoid circular definition of acceleration in which acceleration is measuring in regards to point without acceleration or, more euphemistically, in regards to referential frame at rest, we should consider four possible explanations:

1. Another end of force in equation (4) is directed to gravitational field of dominant adjacent mass. According this explanation the inertia is interaction of the body with all gravitational other fields. Mach believed that inertia has origin in mutual interaction with gravitational masses in whole universe and this hypothesis is known as Mach Principle. Such center of all masses in universe must be at rest according law of energy and mass conservations' laws and this indirectly implies that absolute velocity exists as natural fact. The results from Cobe satellite imply that this could be plausible fact. It also means that there will be no inertia in empty space.
2. Inertia in equation (4) also could be caused by acceleration in regards to ether. According this hypothesis ether pervades all bodies causing inertia. Formula for total energy of the body is $E = m \cdot c^2$, and speed of light c is certainly parameter of the ether and not of the body at all. The recent investigation performed by the Boomerang group via Cobe satellite showed that absolute velocity could be measured by Doppler's effect applied to 2.7K background radiation which makes eater's theory more plausible (see [1] & [2]) representing actual temperature of the eater fluid. In empty space inertia would exist because space by itself causes inertia.
3. Another end of inertial force in equation (4) is directed to masses in body's vicinity only. Distant masses have only negligible influence. This means that magnitude of inertia of particular body is defined by amount of neighboring massive bodies surrounding it. This is only hypothesis allowed by the Relativity Theory, but equation (4) should also contain an additional constant which should accommodate this equation for operation in vicinity of various massive masses: $\vec{F}_{1,2} = k_{m_1, m_2} \cdot m_1 \cdot \vec{a}_{1,2}$, on Earth's sea level we have that is $k_{m_1, m_2} = 1$. If this is so, then it means that we should be able to repeal on the immovable gravitational field of the Earth, or actually to repeal on earth without mechanical interaction.
4. Inertial force is defined by the memory of every single elementary particle to the position of its creation. While memory is information then it means that information by itself defines inertia and every single piece of matter has its own memory – this means that there is no transmitter of interaction, there is only a comparable memory to the previous and initial states and the differentiation in equation (4) is precisely this. So, in that case there must be existing hidden variables that act as storage for memories of the body which is necessary for common inertial behavior of the body. Einstein-Podolsky-Rosen effect could push

theory in the direction, but this also means that impulse interaction is just information exchange and we have just jumped into the area of the Nobel's awarded Digital Physics theory. If this is so, then we could produce energy and manage inertia just by altering of this or these hidden registers of every single elementary particle of the body which certainly should be possible if these variables exist. This also makes levitation and telekinesis quite plausible effect – the mind as purely quantum phenomenon should be able to interfere with another quantum phenomenon. We know that mind and free will is quantum phenomenon simply because we are not able to predict previous position of our hands as we could do with planets according position and velocity. And we cannot do that just because our hands are not driven by analytical functions on which Taylor's series could be applied and also Newton's third law. If this is not analytical function than it is fractal one that is governed by the probability distribution of the random events. So, if there is free will then it must be altered by a random parameter mixed with facts and only known natural phenomena that are based on random distribution are quantum phenomena. So, existence of mind and life make this item plausible.

The origin and exact position of another end of the radius vector in formula (4) remains undefined, but there is the fact that this end is certainly pointed to the cause of the phenomenon of inertia.

If the immovable ether is rather fact than fiction, then we should use it as reference for acceleration's measurement, which implies that contemporary physics should be seriously modified, especially Galilean and Einstein relativities [3]. So, in that case the magnitude of gravitational field is the constant value that is proportional to the mass and at the same time the inertia of the body is not constant and it is proportional to mass and resulting gravitational field of adjacent bodies. We should accept this solution which is in concordance to M hypothesis in which physical fields have their own velocity that match the velocity of the fields' sources. If it is so, then we should be able to repeal onto the gravitational field of Earth which follows the globe's rotation [4].

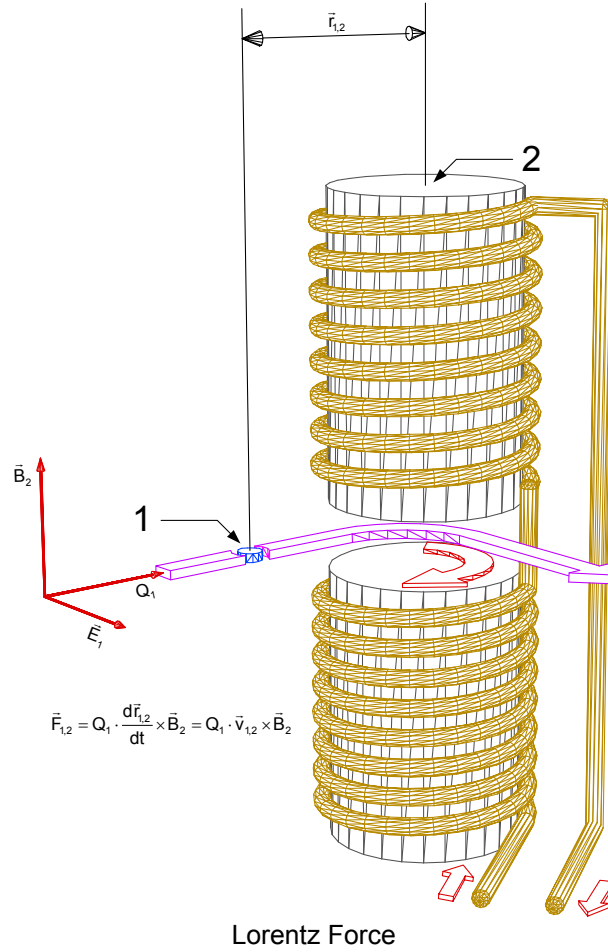
POSSIBLE SOLUTION

Solutions 1 and 4 are too complicate while solution 1 requires finite universe for finite inertial force and solution 4 requires intrinsic coordinate system which is allegedly proven by artificially created photons in PET photons' pair emission. So, let us analyze solutions 2 and 3 first.

At this very moment it is of crucial importance to be determined whether the inertia is related rather to eater then to local gravitational potential to distinguish solutions 2 and 3. So, if the inertia is caused by ether interaction, then it means that solution 2 is correct otherwise solution 3 is correct.

Following picture displays situation with a charge is passing between two magnets that affect it with relative Lorentz force in which is not quite clear on what is related the velocity in the Lorentz force, i.e. what is referential point for the velocity's determination:

Fig. 2



Official Lorentz force formula is:

$$\vec{F} = Q \cdot \vec{v} \times \vec{B} \quad (5)$$

Whereas $\vec{v}$ is velocity measured in respect to referential frame or observer. It is quite obvious that this velocity must be determined in regards to magnet while the magnet is the source of the force, and not eater or anything else. Correct Lorentz force formula within M hypothesis therefore should be:

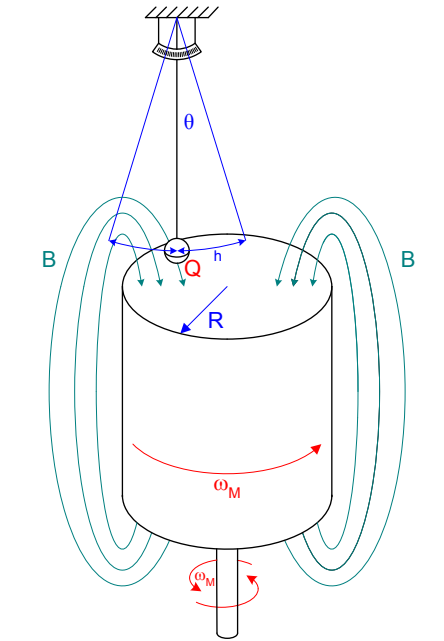
$$\vec{F}_{1,2} = Q_1 \cdot \frac{d\vec{r}_{1,2}}{dt} \times \vec{B}_2 = Q_1 \cdot \vec{v}_{1,2} \times \vec{B}_2 \quad (6)$$

Whereas $\vec{v}_{1,2}$ is velocity measured in respect to time's derivative of distance between the charge and the magnets.

There is another simple experimental setup able to duly confirm that rotating permanent homopolar magnet has motional magnetic field. The setup is consisted of homopolar magnet and a small ball charged with Van de Graaff¹ generator and hanged above the homopolar magnet as it is shown on the following picture:

¹ Robert Jemison Van de Graaff, 1901–1967

Fig. 3



Homopolar Magnet Affects a Charge

The setup depicted on the above picture clearly shows that hanged charge is vigorously affected by the homopolar magnet's rotation.

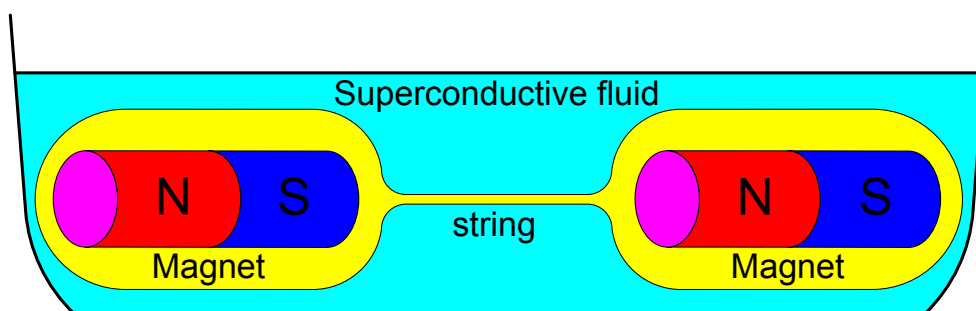
Experimentally determined inclination angle of tether that carry charge almost perfectly matches following theoretical formula:

$$Q_1 \cdot \omega_M \cdot h \cdot B_2 = m_1 \cdot g \cdot \frac{h}{\ell} \cdot \sqrt{1 - \left(\frac{h}{\ell}\right)^2} \quad (7)$$

These field's lines could be also represented as strings. Strings are idealized field's lines within Classical Concept of Field's Strings although Quantum Mechanics claims that these strings are quite real and their number is finite and defined trough field's flux quantum.

Classical Concept of Field's strings is provoked by the following experiment with two magnets immersed in superconductive fluid:

Fig. 4

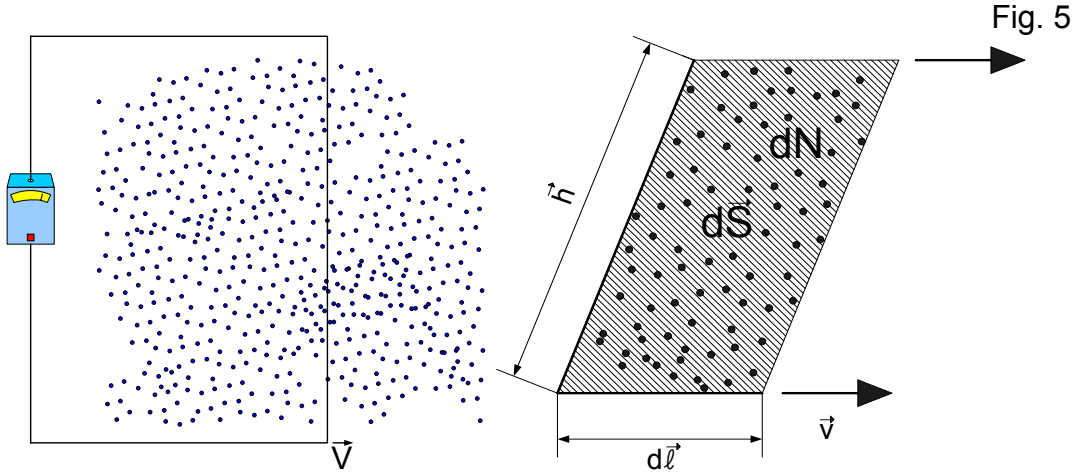


String in E^1 Space

This is very similar to Gauss² field's formula which is just continuum equation of field's lines:

$$\rho = \epsilon \cdot \vec{\nabla} \vec{E} = \epsilon \cdot \Delta V \quad (8)$$

The places where magnetic strings penetrate surface are represented by points on the following pictures with moving conductors that smash those strings:



In Classical Field's String Theory we define potential as number of strings that intersects a wire per time:

$$U = \frac{dN_B}{dt} \quad (9)$$

Magnetic field is defined as concentration of strings penetrating the surface:

$$\vec{B} = \frac{dN_B}{dS} \quad (10)$$

And also:

$$\vec{E} = \frac{dN_E}{dS} = \frac{1}{\epsilon} \cdot \frac{dQ}{dS} \quad (11)$$

Directly from Gauss law we have:

$$N_E = \iint_S \vec{E} \cdot d\vec{S} = \frac{Q}{\epsilon} \quad (12)$$

String's force between poles is then defined as:

$$\vec{F}_{1,2} = Q_1 \cdot \frac{dN_2}{dS_1} \quad (13)$$

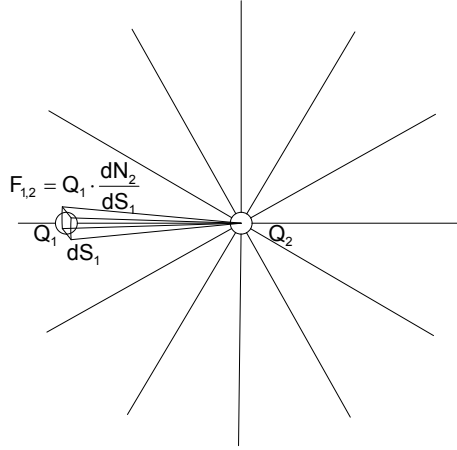
² Johann Carl Friedrich Gauss, 1777–1855

Also:

$$\vec{F}_{2,1} = Q_2 \cdot \frac{dN_1}{d\vec{S}_2} = -\vec{F}_{1,2} \quad (14)$$

This concept is depicted on the following picture:

Fig. 6



Force between charges in that case is defined by the hyperspace Coulomb's formula:

$$\vec{E}(Q,D,\vec{r}) = \frac{Q \cdot \hat{r}}{\epsilon \cdot S(\vec{r},D)} = \Gamma\left(\frac{D}{2}\right) \cdot \frac{Q \cdot \hat{r}}{2 \cdot \epsilon \cdot \pi^{\frac{D}{2}} \cdot |\vec{r}|^{D-1}} \quad (15)$$

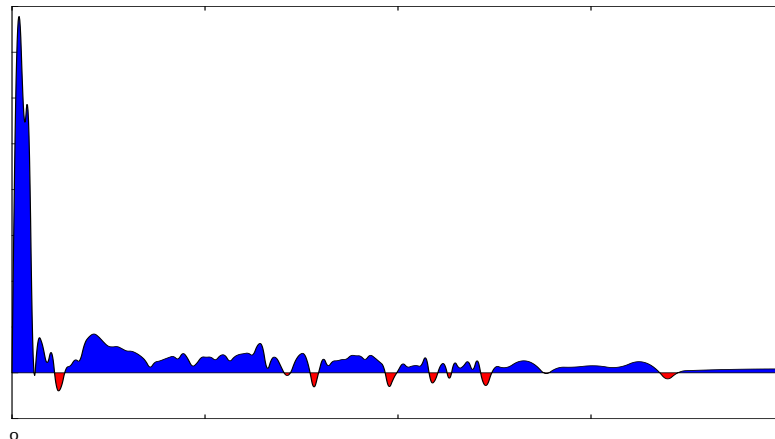
And:

$$\vec{F}(Q,D,\vec{r}) = \Gamma\left(\frac{D}{2}\right) \cdot \frac{Q_1 \cdot Q_2}{2 \cdot \epsilon \cdot \pi^{\frac{D}{2}} \cdot |\vec{r}|^{D-1}} \cdot \hat{r} \quad (16)$$

Whereas D is number of dimensions of strings' distribution where D is $1 \leq D \leq 3$ regarding the distribution in the particular case and ϵ is constant of electric permittivity of vacuum or medium.

Curve of mass in our galaxy has negative parts implying that something disturbs distribution of gravitational strings in the galaxy:

Fig. 7



Above graphic also shows regions with negative masses that could be well explained with the strings hypothesis.

Force between two charges immersed in superconductive fluid ($D = 1$) is:

$$F(Q,1,1) = \frac{Q_1 \cdot Q_2}{2 \cdot \epsilon} \quad (17)$$

The force will remain constant regardless the distance till the potential energy of the string is reached and than the string is cut off.

It is interesting that lot of chemical reactions could be explained with saturation of strings bounding between atoms in molecules. Exact angle between hydrogen atoms in water molecule is $\text{ACOS}(-1/4) = 104^\circ 25' 39''$, which is angle between atoms in couples of water molecules packed on the way in which hydrogen atoms are able to interact with saturated connection of oxygen atom of opposite water molecule. String interaction can also fully explain metallurgic connection between metallic atoms, which rested unclear for millenniums. This means that whenever atoms are very distant from each other, then they establish strings' bounding with nearest atoms creating neutral molecules. But, in metals where atoms are better packed we have closes distance and such atoms can establish multiple connection with contiguous neighbor atoms. And it seems that it is same case with Van der Waals³ connection between water molecules. Such connections are much weaker than real covalent connections just because only a fraction of strings interacts with numerous surrounding atoms enabling creation of fractional neurons' like connections. This might be the answer for strange water behavior

The same ability also enables continuous mixing of different metals creating alloys with isotropic cohesive force.

Following relations between basic physical constants are derived on the premise that there are vibrations like interactions between the strings in the certain spatial crystalline structure of the ether:

$$\gamma \approx \frac{12}{5} \cdot \pi \cdot \epsilon_0 \approx \frac{1}{50 \cdot c} \quad (18)$$

Dielectric permittivity of vacuum is:

$$\epsilon_0 \approx \frac{1}{120 \cdot \pi \cdot c} \quad (19)$$

And also astonishingly accurate connection between electron's charge and basic constants of ether is yield by the theory:

$$Q_e \approx \frac{\pi \cdot \sqrt{h \cdot c \cdot \epsilon_0}}{2 \cdot (2 \cdot 6 + 1)} \approx \frac{1}{52} \cdot \sqrt{\frac{\pi \cdot h}{30}} \quad (20)$$

³ Johannes Diderik van der Waals, 1837-1923

Photon's dipole charge is:

$$Q_f = \sqrt{\epsilon_0 \cdot c \cdot h} \quad (21)$$

Whereas h is Planck constant, c is speed of light and ϵ_0 is dielectric permittivity of vacuum.

Within M hypothesis of motional physical fields the increase of magnitude of magnetic field is caused by upturning of concentration of magnetic strings in the particular area. Than the upturn of the magnetic strings' concentration can be achieved only by migration of those strings whose then by their motions intersect the electric contour inducing electric potential according equation (9):

$$N = N_0 + \int_0^t \oint_{\ell} \frac{dN}{d\vec{S}} \cdot (d\vec{\ell} \times \vec{v}) \cdot d\vec{t} \quad (22)$$

$\Rightarrow$

$$\frac{dN}{dt} = \iint_{\vec{S}} \vec{\nabla} \times \left(\vec{v} \times \frac{dN}{d\vec{S}} \right) \cdot d\vec{S} \quad (23)$$

$\Rightarrow$

$$\frac{d^2N}{dt \cdot d\vec{S}} = \vec{\nabla} \times \left(\vec{v} \times \frac{dN}{d\vec{S}} \right) \quad (24)$$

Above formula is the general field's string equation. This is also general 2D continuity equation of strings penetrating generalized surface. After we insert (10) into (24) we will obtain following formula for the magnetic field acting to a plane $\hat{n}$ collinear with the field, so we have following continuum equation:

$$\frac{d\vec{B}}{dt} = \vec{\nabla} \times (\vec{v} \times \vec{B}) \quad (25)$$

Whereas $\vec{B}$ denotes magnetic field and $\vec{v}$ denotes velocity of magnetic field's lines' migration. We can generalize above equation to all persistent physical fields originated in their non-decaying poles with uniform strings' distribution including gravity field too, so within M hypothesis the next equation of gravitational field is valid:

$$\frac{d\vec{G}}{dt} = \vec{\nabla} \times (\vec{v} \times \vec{G}) \quad (26)$$

Classical String Theory's formula of electric field is:

$$\frac{d\vec{E}}{dt} = \vec{\nabla} \times (\vec{v} \times \vec{E}) \quad (27)$$

After (10) is inserted into (9) we have:

$$U = \frac{d}{dt} \oint_S \vec{B} \cdot d\vec{S} = \frac{d\Phi}{dt} \quad (28)$$

Whereas U is electric potential, B is magnetic field, S is element of area, t is time and Φ is flux of magnetic field.

Above equation is precise derivation of Gaussian induction's formula. It is directly derived by string idealization within M hypothesis of motional magnetic field.

After Stokes⁴ mathematical transformation is applied to above equation and potential is basic replaced with its basic definition, it is derived:

$$\oint_S \vec{\nabla} \times \vec{E} \cdot d\vec{S} = \frac{d}{dt} \oint_S \vec{B} \cdot d\vec{S} \quad (29)$$

Above equation can be differentiated on surface and then we obtain first Maxwell⁵ equation:

$$\vec{\nabla} \times \vec{E} = \frac{d\vec{B}}{dt} \quad (30)$$

It should be noticed that there is total time derivatives in the Maxwell equations within M hypothesis instead of officially accepted partial ones.

We have just seen that equation which corresponds to first Maxwell equation is actually just a formula for migration of magnetic lines, but second Maxwell like equation cannot be derived so simply, therefore this second Maxwell's like equation could be derived directly from both empiric Biot⁶-Savart⁷ law and equation (27):

$$d\vec{B}_1 = -\frac{\mu}{4 \cdot \pi} \cdot \frac{I_1 \cdot d\vec{\ell}_1 \times \hat{r}_{1,2}}{\vec{r}_{1,2}^2} \quad (31)$$

Whereas I is electric current, $r_{1,2}$ is distance between in current element and measuring position, $d\ell$ is infinitesimal current path and B_1 is magnetic field on the test position.

Above equation can be modified on the following way:

$$d\vec{B}_1 = -\frac{\mu}{4 \cdot \pi} \cdot \frac{\frac{dq}{dt} \cdot d\vec{r}_{1,2} \times \hat{r}_{1,2}}{\vec{r}_{1,2}^2} = \frac{\vec{v}_{1,2}}{c^2} \times \frac{1}{4 \cdot \pi \cdot \epsilon} \cdot \frac{dq \cdot \hat{r}_{1,2}}{\vec{r}_{1,2}^2} = -\frac{\vec{v}_{1,2}}{c^2} \times d\vec{E} \quad (32)$$

⁴ George Gabriel Stokes, 1819–1903

⁵ James C. Maxwell, 1831 - 1879

⁶ Jean-Baptiste Biot, 1774-1862

⁷ Felix Savart, 1791-1841

After integration we have:

$$\vec{B} = -\frac{\vec{v} \times \vec{E}}{c^2} = \frac{\vec{E} \times \vec{v}}{c^2} \quad (33)$$

After Curl is applied on above equation and with help of (27) we have:

$$\vec{\nabla} \times \vec{B} = \frac{\vec{\nabla} \times (\vec{v} \times \vec{E})}{c^2} = -\frac{1}{c^2} \cdot \frac{d\vec{E}}{dt} \quad (34)$$

Anent:

$$c^2 \cdot \vec{\nabla} \times \vec{B} = -\frac{d\vec{E}}{dt} \quad (35)$$

We have equations (30) and (35) that correspond to Maxwell ones. While there are total time derivatives in both (30) and (35) there is no need for missing DC term with current density which describes appearance of magnetic field near conductors with direct constant current only. This term was artificially added in official Maxwell equation just to keep its ability to handle appearance of constant magnetic field near DC conductors.

Above notification can be generalized on the following way, after time derivation is applied the equation (33) becomes:

$$\frac{d\vec{B}}{dt} = \frac{\vec{E} \times \vec{a}}{c^2} \quad (36)$$

According appropriate Maxwell like equation we have:

$$\vec{\nabla} \times \vec{E}_{ind} = \frac{\vec{E} \times \vec{a}}{c^2} \quad (37)$$

There is also general vector identity:

$$\vec{E} \times \vec{a} = \vec{\nabla} \times (\vec{V} \cdot \vec{a}) - \vec{V} \cdot \vec{\nabla} \times \vec{a} \quad (38)$$

Then we have:

$$\vec{\nabla} \times \vec{E} = \frac{\vec{\nabla} \times (\vec{V} \cdot \vec{a})}{c^2} - \frac{\vec{V} \cdot \vec{\nabla} \times \vec{a}}{c^2} = \frac{\vec{\nabla} \times (\vec{V} \cdot \vec{a})}{c^2} - \frac{\vec{V} \cdot \vec{a}}{c^2} \quad (39)$$

Additional electric field induced by acceleration added to a particle in the electric potential V is:

$$\vec{E}_{ind} \approx \frac{\vec{V} \cdot \vec{a}}{c^2} \quad (40)$$

Inertial phenomenon of electron becomes:

$$\vec{F}_{\text{inertial}} = Q_1 \cdot \vec{E}_{\text{ind}} = \frac{Q_1 \cdot V_2 \cdot \vec{a}_{1,2}}{c^2} = \frac{\mu \cdot Q_1 \cdot Q_2 \cdot \ddot{\vec{r}}_{1,2}}{4 \cdot \pi \cdot |\vec{r}_{1,2}|} \quad (41)$$

For mass we have following analog equation:

$$\vec{F}_{\text{ind}} = \frac{\gamma}{c^2} \cdot \frac{m_1 \cdot m_2 \cdot \vec{a}_{1,2}}{|\vec{r}|} = m_1 \cdot \vec{a}_{1,2} \cdot \frac{V_{\text{grav}_2}}{c^2} \quad (42)$$

Formula (41) yields connection between inertial property of an electron and magnitude of external electric potential pervading it.

Formula (42) clearly shows that the inertia of a mass is caused by the external gravitational potential that pervades this mass and that there is not constant of proportion in formula (4) only due to very convenient choice of the mass and force units. Equations (41) and (42) are solid proofs that solution 3 is probably the valid one.

CONCLUSION

Above analysis of the Third Newton Law's equation (1) or (4) clearly shows that the referential point used for acceleration measurement is omitted there. This point certainly could be neither arbitrary nor relative one and this must be real position somewhere in our space.

Proposed solution is based on M hypothesis and inertial forces of massive and charged bodies given by equations (41) and (42) derived from the real effect of Faraday's induction through few mathematical vector identities offering the connection between the local charge and the nearby charges, but then we still have recursive connection between these local charges and something else and therefore we have convergent definition (Petitio Principi type of logical fallacy, or there is an invisible referential frame?) which led us directly to variant of solution 1 in which inertial property is connected to all masses in space but the adjacent masses much more affects inertial property than the distant ones.

References:

1. Boomerang Project, <http://cmb.phys.cwru.edu/boomerang/>,
2. Cobe Satellite, <http://aether.lbl.gov/www/projects/cobe/>,
3. On The Electrodynamics Of Moving Bodies, A. EINSTEIN, 1905,
4. <http://www.youtube.com/watch?v=4foY5r2TMOo>.