The mathematics of a self-charging smart-phone

JACOB MANALE
Department of Mathematical Sciences
University of South Africa
Corner Christiaan de Wet street and Pioneer avenue, 1709 Florida, Johannesburg, Gauteng Province
REPUBLIC OF SOUTH AFRICA
manaljm@unisa.ac.za http://www.unisa.ac.za

Abstract: - It is our firm belief that space is abundant with electromagnetic energy; gravitational electromagnetic energy. What is commonly accepted is that matter has mass and weight, and that some also have magnetic field, like the planets, while others do not, like some asteroids. Our hypothesis is that each atom, in the known universe, has both gravitational and magnetic fields, and the latter does not refer to the permanent magnetic field. The key to harvesting this energy is in the frequencies at which it is transmitted through space, and distinct atoms have distinct frequencies. Here we restrict our attention to the element platinum.

Key-Words: - Navier-Stokes equations, Symmetry analysis, Differentiable manifolds, Gravitation.

1 Introduction

The idea of free space energy is not new. It can be traced back to the Serbian-American genius Nikola Tesla [1], 1856-1943. He held that a human body has a velocity v, from which the energy $m\,v^2/2$ results, where m is the person's mass. This v was the Achilles heel his detractors used to find flaws in this idea, because none could visualise it [2].

We are in agreement with Tesla on the existence of a velocity v, that relates to the free space energy. While he allotted it to human bodies, ours is to subatomic particles, and we extend it to the three-dimensional space, so that $\boldsymbol{V} = (U; V; W)$. For simplicity here, we discuss it in a two-dimensional space, that is done in subsection 2.2. We are also in agreement with his detractors that this velocity is not humanly perceptible: measurable but unfathomable that it can actually be, but it is. We hold that in these processes, the speeds of the subatomic particles, $||\boldsymbol{V}||$, rise to astronomical values from zero and back, in split seconds, as given in Figure 3, such that the drift of the atom is $c = E(||\boldsymbol{V}||)$, the speed of light. We opt for equality $=$, instead of the approximate sign $\approx$, even though $E(||\boldsymbol{V}||)$ is not necessarily a constant. This is because the laboratory can be mobile, but its speed do not make any significant difference when added to c. A Concorde's top speed, for example, only adds or subtracts about 0.001%, which is insignificant.

It may be humanly imperceptible to agree that we are moving at the speed of light, but it is probably digestible to say we are moving with that speed relative to the galactic centre.

Our senses perceives only what is average, which is the speed at which the earth moves at, relative to the galactic centre. For incompressible materials, the Navier-Stokes equations are ideal for us for determining these speeds, and we had to develop a special mathematics for it, hence our title. The compressible case has its challenges.

Our opinion regarding possible earlier detection of this Tesla velocity, we believe the Michelson Morley interferometer experiment [3] was the best setup to do so. Instead, it only led to Einstein's special relativity mechanics.

Lately, Dennis Siegel [4], developed a device similar to what Tesla hypothesised. The problem with it is that, it harvests energy that is already there, like the power lines, fridges, and radio broadcast frequencies. That is, anything that emits electromagnetic waves. Ours harvests every element in existence.

While our attention is on electric energy, there has been progress in extending the work in energy of a thermal nature, see [5]. Ours is electromagnetic, gravitational electromagnetic waves.

There are several theoretical approaches to gravity, most developed after Isaac Newton's law of gravitation. Newton maintained that gravity causes objects to fall. Albert Einstein, on the other hand, held that they contract during this fall. Our view is that it is not only the contractions that are present. There are periodic deformations of rarefactions alternating with contractions. These are best describe through the generalized Navier-Stokes equations, easier described through the regular Navier-Stokes equations, because of their simplicity, discussed in Section III. Symmetry analysts, using a theory introduced by Lie [6], have investigated these equations for more than five decades now with very little success, see in particular Ibragimov's works [7], [8], [9] and [10]. Bright [11] introduced a very brilliant notion of reducing the equations to steady state. This he did for the Euler equations. It was extended to the Navier-Stokes equations by Boisvert, Ames and Srivastava [12]. We plan to address these deficiencies, one Lie sub-algebra at a time.

The hypothesis leading to the model is discussed next, in Section 2. The steps followed in arriving at practical validation, are presented in Table 1, and a patentable design in subsection 3.4 to Section 4.

Theoretically, we interpret the deformations through the continuum principle; The transformations at the sub-atomic level, interpreted through quantum mechanics, lead to differential equations with electric and magnetic fields as the dependent variables; The square of each field relates to gravity; The frequency of this squared field is the one we are interested in.

In brief, this invention is in electronics.

2 The theoretical basis

The power generation is closely related to Piezo electricity. The difference is that in our case any element can generate the power, and not some crystals. The elements or compounds need not be polarized.

The energy is from the strains and stresses that materials suffer from being in a gravitational forces with others. These causes momentary distortions.

2.1 The model

To begin, let us suppose that the parallel components of velocities of the two charges in an atom, orthogonal to the vector pointing to the other atom, are separated by the distance r, such that

$$s = S + r, \qquad (1)$$

where s and S are the position vectors of the two charges from some reference point. It is important at this stage to emphasize that $r = ||r||$ is not the distance between the charges. As the charges move, the distance r changes. This then makes it possible for the motion to be explicable through deformations, leading to deformation tensors.

The usual deformation strain tensor ϵ_{KL} has the form

$$\epsilon_{KL} = \frac{1}{2}\,(r_{K,L} + r_{L,K} + r_{M,K} r_{M,L}), \qquad (2)$$

a second-order tensor with 9 components.

Our assumption is that classical mechanics does not address internal body motions linked to the translational motion of such a body. On the other hand, most experiments and measurements are conducted on the basis of classical mechanics, meaning the parameters that find their way into the governing equation, that we are about to derive, are hinged on classical mechanics. One other point to consider is that continuum mechanics is usually applied to fluid flow dynamics, and not to whole rigid body motion. What is to be done then is deduce conditions under which Cauchy's laws of motion can be used to explain rigid body motion. That is, align classical mechanics to continuum mechanics.

This alignment is secured here through a procedure that requires reducing Cauchy's first law of motion to Newton's second law of motion. This involves neglecting the nonlinear terms. Hence,

$$\epsilon_{KL} = \frac{1}{2}\,(r_{K,L} + r_{L,K}), \qquad (3)$$

This simple form makes it possible to use a simple linear constitutive law to introduce the stress tensor σ_{ij} , and relate it to ϵ_{KL} . It too is a second-order tensor with 9 components. One such linear relation, preferred here, is Hooke's law:

$$\sigma_{ij} = C_{ijKL}\,\epsilon_{KL}. \qquad (4)$$

Here C_{ijKL} is a fourth-order tensor. It has 81 components and they depend on the thermodynamic state of the medium. A further simplification with $\sigma\_(ij) = dF/dA$ where the force F acts on a body with the cross-sectional area A and $r_{K,L} + r_{L,K} = dr/ds$ yield

$$\frac{dF}{dA} = \frac{Y}{2}\frac{dr}{ds}. \qquad (5)$$

For an isotropic medium, given symmetric tensors, without shearing motion, 80 components of C_{ijKL} are lost, so that $C_{ijKL} = Y$: Young's modulus. Hence,

$$dr = \frac{2}{Y}\frac{dF}{dA}\,ds. \qquad (6)$$

The speed of the object $d\,v = dr/\tau$ is then

$$dv = \frac{2}{\tau Y}\frac{dF}{dA}\,ds. \qquad (7)$$

with $\tau = 2l/c_s$ and c_s is the speed of the mechanical wave within the object, and l the length of this object parallel to the direction of travel. The change in momentum $dp = d(mv) = \rho l d(Av)$ is then

$$dp = \rho lv dA + \frac{2\rho Al}{\tau Y}\frac{dF}{dA}\frac{ds}{dt}\,dt. \qquad (8)$$

This is the envisaged model. That is, the equation that would lead to a formula for G with the best precision.
Momentum in Newtonian mechanics does not include oscillations perpendicular to the direction of travel. Hence,

$$dp = \frac{2\rho Al}{\tau Y}\frac{dF}{dA}\frac{ds}{dt}\,dt, \qquad (9)$$

where $dA = 0$ when $dF = 0$.

This expression eventually assumes the form

$$dp = \frac{2\rho l\,c_s}{\tau Y}F dt = F dt, \qquad (10)$$

That, is $dp = F dt$. This is Newton's second law of motion, obtained here using the continuum hypothesis, paving the way for the determination of the governing equation of motion through continuum mechanical principles, by suggesting the omission of nonlinear terms from the strain tensor; momentarily suspending rigidity.

After some simple algebra and elementary calculus, a differential equation in G emerges, based on the gravitational pull between two atoms, and equated to the electrodynamic forces between them. That is,

$$G_{tt} - c^2 G_{rr} = \frac{(c\,G_r)^2}{2\,G} + \frac{\mu_0}{2\pi}\left(\frac{1}{uZ}\frac{Q}{4\pi\epsilon_0}\right)^2\frac{q^2}{m_1 m_2 r^4}, \qquad (11)$$

where μ_0 and ϵ_0 are respectively the permittivity and susceptibility of free space, u the atomic mass unit, q and Q being the charges in the atom, m_1 and $m_2$being the masses and c the speed of light. The two masses are equal; hence $m_1 = m_2 = Zu$, where Z is the atomic number of the atom. The charges, too, are equal. That is, $q = Q = Ze$, where e is the unit of charge.

2.2 The fluid flow connection

The solutions we determine are the ones that follow from one of the sub-algebras Pukhnachev established for the two-dimensional Navier-Stokes equations

$$\mu\nabla^2 U - p_x - \rho_0(U_t + U\,U_x + V\,Uu_y) = 0, \qquad (12)$$

$$\mu\nabla^2 V - p_x - \rho_0(U_t + U\,V_x + V\,V_y) = 0, \qquad (13)$$

with the continuity condition

$$U_x + V_y = 0. \qquad (14)$$

The unknowns $\boldsymbol{V} = (U; V)$ and p are the spatial velocity vector and pressure. For a Newtonian fluid, the viscosity coefficient μ is a constant, while ρ_0, also a constant, is the mass density.

In 1960, Pukhnachev investigated the equations and found eight symmetries:

$$G_1 = 2t\frac{\partial}{\partial\,t} + x\frac{\partial}{\partial\,x} + y\frac{\partial}{\partial\,y} - U\frac{\partial}{\partial\,U} - V\frac{\partial}{\partial\,v} - 2p\frac{\partial}{\partial\,p}, \qquad (15)$$

$$G_2 = -y\frac{\partial}{\partial x} + x\frac{\partial}{\partial y} - V\frac{\partial}{\partial U} + U\frac{\partial}{\partial V}, \qquad (16)$$

$$G_3 = \frac{\partial}{\partial t}, \qquad (17)$$

$$G_4 = \psi_1(t)\frac{\partial}{\partial x} + \psi_1{}'(t)\frac{\partial}{\partial U} - y\psi_1{}''(t)\frac{\partial}{\partial p}, \qquad (18)$$

$$G_5 = \frac{\partial}{\partial x}, \qquad (19)$$

$$G_6 = \psi_2(t)\frac{\partial}{\partial y} + \psi_2{}'(t)\frac{\partial}{\partial V} - y\psi_2{}''(t)\frac{\partial}{\partial p}, \qquad (20)$$

$$G_7 = \frac{\partial}{\partial y}, \qquad (21)$$

$$G_8 = \phi(t)\frac{\partial}{\partial p}. \qquad (22)$$

For the sub-algebra $< G_1; G_2 >$, Puknachev established the solution

$$U^r = \frac{C_1}{r}, \qquad (23)$$

$$U^\varphi = -\frac{C_2}{r}\int^\xi e^{-\frac{z^2}{4}} z^{C_1+1}\, d\,z + C_3, \qquad (24)$$

$$p = \frac{1}{t}\int^\xi \frac{J_3^2(z)}{z^3}\, d\,z - \frac{C_1^2}{2r^2} + \frac{C_4}{t}, \qquad (25)$$

$$\xi = \frac{r}{\sqrt{t}}, \qquad (26)$$

where C_1, C_2, C_3 and C_4 are arbitrary constants, with

$$r = \sqrt{x^2 + y^2}, \qquad (27)$$

$$\varphi = \arctan\left(\frac{y}{x}\right), \qquad (28)$$

$$U^r = U\cos\varphi + V\sin\varphi, \qquad (29)$$

$$U^\varphi = V\cos\varphi - U\sin\varphi. \qquad (30)$$

3 Model solution and prototype basis

3.1 Solution to Pukhnachev's results

The solutions (24) and (25) are in integral form, and therefore not actually complete. We completed (24) in a soon to appear publication in *WSEAS Transactions in Mathematics*, 2019, wherein the Gaussians in figures 1 and 2 emerge. Here we present only the solution, and is

$$u^\varphi = -\frac{C_2}{r}\frac{\partial^{(C_1+1)/2}}{\partial\alpha^{(C_1+1)/2}}\left\langle\sqrt{\frac{2}{\alpha}}\left(-4e^{-2\pi\frac{\alpha z^2}{2}}\sqrt{\pi}s\,\frac{\sec\left[\sqrt{\pi}s\sqrt{e^{\pi\frac{\alpha z^2}{2}}\left(\frac{-2}{e^{\pi\frac{\alpha z^2}{2}}} + \frac{4}{e^{\pi\frac{\alpha z^2}{2}}}\pi\frac{\alpha z^2}{2}\right)}\right]}{-2e^{-\pi\frac{\alpha z^2}{2}} + 4e^{-\pi\frac{\alpha z^2}{2}}\pi\frac{\alpha z^2}{2}} + \frac{2e^{-2\pi\frac{\alpha z^2}{2}}\sqrt{\pi}s}{-2e^{-\pi\frac{\alpha z^2}{2}} + 4e^{-\pi\frac{\alpha z^2}{2}}\pi\frac{\alpha z^2}{2}}\right)\right\rangle\Bigg|_a^\xi + C_3, \qquad (31)$$

with $z = \xi$. This result is plotted in Figure 3, and compares favorably with our notion of Tesla's speeds.

3.2 Circuit for the prototype equations

From Kirchoff's rules, the part of the circuit containing the inductor leads to the differential equation

$$L\frac{d^2q_1}{dt^2} + \frac{q_2}{C} = 0, \qquad (32)$$

where q_1 is the inductor charge, L the inductance, q_2 the capacitor charge, C the capacitance, and t the independent variable.

The part containing the diode, leads to

$$\frac{dq_2}{dt} - \frac{dq_1}{dt} = I_0\left(e^{\frac{q_2 - q_1}{n\,K\,T}} - 1\right), \qquad (33)$$

where I_0 is the diode saturation current, n the ideally factor, k Boltzmann's constant, T the temperature, and v the induced voltage.

The third equation is

$$v = r\left(\frac{dq_2}{dt} - \frac{dq_1}{dt}\right), \qquad (34)$$

where r is the resistance.

3.3 The design of the experimental tests

We used a catalytic converter as source for the element platinum, and a signal-hound spectrum analyzer to receive the electromagnetic radiation from it. The measured observations are in Table 1. The tables includes the value calculated through equation (11). The pulse read through spectrum analyzer is displayed in Figure 2.

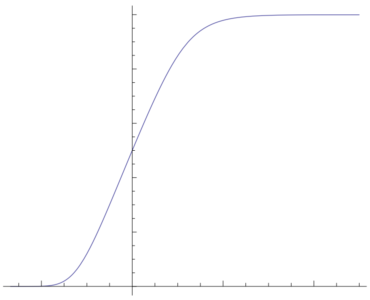

Figure 1: A plot of the Gaussian obtained through Numerical techniques.

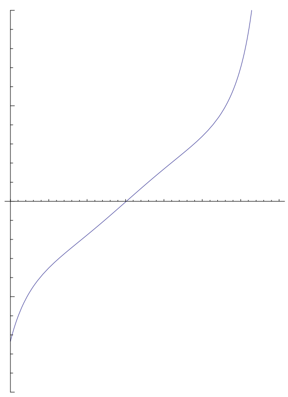

Figure 2: The Gaussian as determined by methods of this paper.

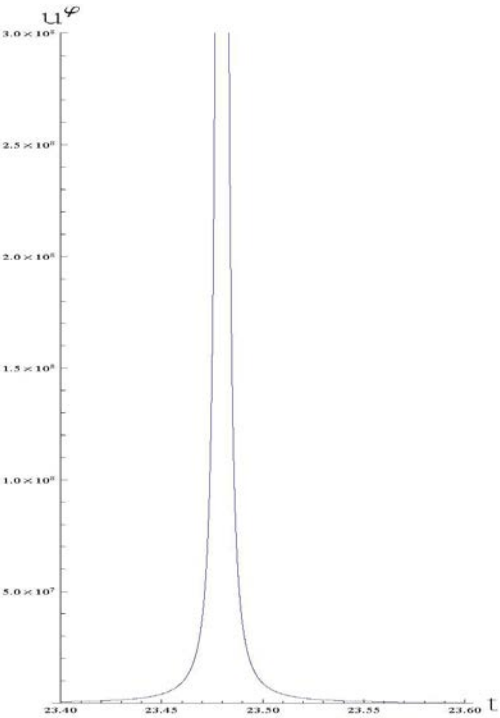

Figure 3: A plot of U^φ against t.

4 Discussion and conclusion

The force that leads to the velocity U^φ , gets into the Navier-stokes equations through the pressure p. The generator for this pressure is assumed to be the motions of all galaxies and all matter they contain, around the galactic centre.

The velocity U^φ leads to the relative velocity between the electron core and the positive core of the platinum atom. These are then fed to the Schrodinger equation.

The silicon-chip, proposed in this study, is to be miniaturized, and inserted into a smart-phone. An app is then loaded onto the phone, alerting the chip to the presence of radiation, platinum radiation in particular. The chip then directs the radiation into an energy storage bank inside the phone, suitably batteries that already in production. The phone then takes energy directly from the battery.

Figures indicating the assembly of the chip cannot fit here as they contain extensive details, but are available on request.

References:

[1] N. Tesla, The problem of increasing human energy: with special references to the harnessing of the sun's energy. *Century* ,1900.

[2] Notes to the Editor. Notes on tesla. *The Electrician*, 1900.

[3] E.W. Morley, A.A. Michelson, On the relative motion of the earth and the luminiferous ether. *Science* , 34, 1887, 333-345.

[4] K.S. Adu-Manu, et. al., Energy-Harvesting Wireless Sensor Networks (EH-WSNs): A Review, *ACM Trans. Sen. Netw.*, 14, 2, 20, 2018, 50 pages.

[5] A.L. Cottrill, et. al, , Ultra-high thermal effusivity materials for resonant ambient thermal energy harvesting, *Nature*, 2018, 1-10.

[6] S. Lie, On integration of a class of linear partial differential equations by means of definite integrals. *Arch. Math.*, 2, 1881, 328-368.

[7] N.I. Ibragimov, Selected works: Lie group analysis, differential equations, riemannian geometry, lie backlund groups, mathematical physics, *Grad. Texts in Math.*, I, 2006.

[8] N.I. Ibragimov, Selected works: MSc and Phd theses nonlocal symmetries approximate symmetries preliminary group classication lie group analysis - a microscope of mathematical modelling. *Grad. Texts in Math.*, II, 2006.

[9] N.I. Ibragimov, Doctor of science thesis approximate symmetries lie groups in mathematical modelling. Grad. Texts in Math., IIII, 2008.

[10] N.I. Ibragimov, Selected works: Equivalence groups and invariants of differential equations, extension of euler's methodto parabolic equations, invariant and formal lagrangians conservation laws. *Grad. Texts in Math.*, IV, 2008.

[11] T. A. Bright, Solutions to euler equations using lie group analysis. *Int. J. Non. Linear. Mech.*, 32, 1997, 303-316.

[12] W. F. Ames R. E. Boisvert and U. N. Srivastava, Group analysis and new solutions of navier-stokes equations. *J. Eng. Math.*, 17, 1983, 203-221.

Calculated platinum gravitational wave frequency αHz	Measured platinum gravitation wave frequency αHz
$4.77722\, X\ 10^7$	$(4.87556 \pm 3\%)\, X\ 10^7$

Table 1: A table on the frequency for the platinum atom.