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Formulate Equations for Reciprocity Vector and Scalar of Some Mechanical and Electrical Quantities

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Abstract

This study deals a new concepts of some physical reciprocally quantities which are vectors or scalars and its relationship with the fundamental quantities. The reciprocal of kinematics dimension quantities of moved particle for linear, rotational and circular movement are resulted the quantities that so called the time quantities such as time velocity, time acceleration . Other derivative quantities were derived from the principle equations to produce reciprocal movement equations. For dynamical mechanics, the quantities were derived from the principle equation such as time force, momentum, torque, energy,…ect. Also some reciprocal quantities due to electricity equations include the reactance, electric current, conductivity, …ect, and its derivative quantities are introduced time current density, time power. The results show that the concept of reciprocal of some quantities describes the quantity from two faces, first the principle quantities as were known, which depend on time and second the reciprocal of this quantity, that independent on time and gives a new concept to the same quantity, describe the motion of particle or field. This will add a complete meaning of movement of a particle , if a particle is a moving neutral or charged particle, or intrinsic quantity.

Keywords: reciprocal of velocity, conductivity, reciprocal current , inverse quantity, reciprocal , time electric field.

Introduction

Most the physical laws are dependant on time. The concept of the reciprocally physical quantity, gives another meaning, but with the same concept of moving particle or group of particles, for example: the reciprocal of velocity for kinematics (with no inertia) and for dynamics movement give another concept. (Mushfiq, 2009) defined as well slowness υ' as reciprocal of υ ; $\upsilon' = 1/\upsilon = t / x$, therefore, objectivity demands that motion described in terms of slowness that should be as valid as the description in terms of velocities, its postulate in kinematics is symmetry under reciprocal inversion of velocities or the motion is invariant under inversion $\upsilon \rightarrow 1 / \upsilon$ and vice versa [1]. Slowness must form a group, difference between two slowness is slowness, therefore slowness must be discrete[2]. (Md Shah Alam, et al.2005) Applied the mixed numbers algebra(sum of scalar and vector) in quantum mechanics, electrodynamics and special relativity as a complete tools[3].(Mushfiq,2012) have observed a reciprocal relation between Planck's hypothesis and Einstein's postulate (special relativity). Particle velocity and de Broglie wave velocity are also reciprocally related[4].The longitudinal component of the velocity of a particle at or near a glacier surface, its position is a function of time being term its trajectory velocity distribution are studied by (L.A. Rasmussem, 1983)[5].The reciprocal relation give a correspondence between discrete and continuous quantities[4].Movement constitutes a set defined by intrinsic relativity, reciprocity, and simulation of translation and rotation of all moving entities, the soveons. Soveon, elements and subsets, have angular and linear velocities[6]. In pure geometry the theories of similar (reciprocal theorem of Betti and Raleigh) reciprocal and inverse figures (reciprocal diagram) have led to many extensions of science (e.g. the refractive index being proportional to the velocity or the reciprocal of velocity) [7]. Attenuation coefficient is measured using units of reciprocal length. If the capsular theory was taken, it will use the reciprocal of velocity as a multiplier instead of the velocity itself. For simplicity, the variability of the time t(x) is elapsing between timing events, but the time velocity and reciprocal of velocity are the same[8] The concepts generalize to time - varying and to vector – valued Morse functions [9]. It sometimes uses the reciprocal lattice for crystal structure. It should now be clear that the direct lattice, and its reticular planes, are directly associated (linked) with the reciprocal lattice. (Lima Siow) formulated equivalent principle that the kinetic acceleration is equal to the potential acceleration ($d^2r/ dt^2 = - d\Phi/dr$) [10] Lorson explains, in the equation of motion, time is the reciprocal of space and space is the reciprocal of time. This leads to a new concept of motion, which Larson calls scalar motion. Larson's idea that time and space are reciprocals is difficult to understand in the context of the conventional space – time framework as if to say that the march of time is the reciprocal of extension space, which we ordinarily think of as a container of matter. It is much easier to grasp when we considers a theoretical universe of motion in which the only significant physical quantity is the magnitude of that motion, measured as speed or velocity [11].

As noted earlier, in the RST's (reciprocal state of time)postulated three-dimensional motion, three-dimensional time-motion is the inverse of three-dimensional space-motion. But it is important to remember that space-motion has no direction in time, just as time-motion has no direction in space. Likewise, in the equation of time-motion, v' = t/s, t has direction in time, but s has no direction in time and is a scalar value. Larson summarizes this concept as follows: In the equations of motion in space, time is scalar. In the equations of motion in time, space is scalar and In the equations of motion in space-time, both space and time are scalar. However, in certain situations they are distinguished, as follows[11]. The term reciprocal refers to the key concept of the RST that reflects the postulated relationship of space and time as reciprocals of each other in the definition of motion. This strict study does shed more light into understanding the basic conceptual and theoretical framework on which the concepts are more complicated to other fields of physics. The moving phenomenon of particle are described from two sides dimensionally and timely which have a second new formulas for mechanical and electrical equations . From the practical point of view, it is important because it provides techniques, which can be used in almost any areas of pure and applied researches due to motions.

Theoretical.

Suppose $\mathbf{y_x}$ is a physical vector quantity, and y_t is the reciprocity, so physical quantity vector is equal to the reciprocal of another quantity which have the same direction and another concept of the same phenomena movement:

$$(1)\ \vec{y}_x = -\frac{\hat{x}}{y_t}$$

is the unit vector of the quantity y_t . $\hat{x}$ Where

The negative sign indicates to comparison between two or more values of physical quantity with respect to each other, that the more negativity value have the less value.

$$\vec{y}_x = \frac{d\vec{x}}{dt}$$ suppose

So

$$\vec{y}_x = -\hat{x}\frac{dt}{dx} \qquad (2)$$

Equation 2 can be applied for all vector quantities related to time. If the physical quantity is scalar, thus the reciprocal of any scalar quantity (P) is equal to another concept of the)scalar quantity or: Q(

$$Q = \frac{1}{P} \qquad (3)$$

Equation 3 can be applied to any physical scalar quantity by taken its reciprocity.

Reciprocal of Some Physical Quantities:

1-The Reciprocal of Velocity

It states that the reciprocal of kinetic dimension velocity is equal to the gradient of time or time velocity , which conventionally is expressed as [12]:

$$\frac{\hat{u}}{v_r} = -\text{grad } t \qquad (4$$

or $$-\left(\hat{x}\frac{\partial t}{\partial x} + \hat{y}\frac{\partial t}{\partial y} + \hat{z}\frac{\partial t}{\partial z}\right)$$ Where the R.H.S. of the equation is equivalent to

$$\vec{v}_t = -\frac{\hat{u}}{v_r} \qquad (5)$$

such that $\hat{u}$ is a unit vector of ν_r or ν_t and the absolute value of equation (5) leads to the formula $\nu_r = 1/\nu_t$

The negative sign of eq. (5) is placed to compare two or more numerical values of particle velocity . In other wards the negative numerical value decreases as number increase. The variable ν_t is defined as the reciprocal of dimension velocity or velocity of time in any units (in units: scm^{-1}, sm^{-1}, or μskm^{-1},…).

The change of the time speed or velocity per unit displacement of an object give us another concept of acceleration called time acceleration.

To evaluate the time acceleration, multiply eq. (4) by the grad operator this yields[11]:

$$\nabla.\mathbf{v_t} = -\nabla.\nabla t \qquad (6)$$

or

$$\frac{dv_t}{dr} = -\nabla^2 t \qquad (7)$$

such that the left-hand side of equation (7) is a scalar quantity called the acceleration of time (a_t) (in units s cm^{-2}, s m^{-2} or μsm^{-2},…), ∇^2 is the Laplacian operator, however in three dimension equation (7) becomes:

$$a_t = \frac{\partial^2 t}{\partial x^2} + \frac{\partial^2 t}{\partial y^2} + \frac{\partial^2 t}{\partial z^2} \qquad (8)$$

The kinematical time acceleration in one - dimension, becomes:

$$a_{tx} = \frac{d^2 t}{dx^2} \qquad (9)$$

$$a_{tx} = \frac{dv_t}{dx} \qquad (10)$$

The new groups of equations with respect to time motion for linear and rotation motion are viewed in[12] which results the important equation:

$$a_t = -\frac{2v_{t_0} v_{t_1}(v_{t_1} - v_{t_0})}{t(v_{t_1} + v_{t_0})} \qquad (11)$$

And

$$v_{t1} = v_{t0}\frac{a_t x}{a_x t} \qquad (12)$$

For dynamic movement, the change of time momentum to displacement is equal to time force that is non-vector in unit(gm.s.cm^{-2} or kg.s.m^{-2}) . It is like a second Newton' s law that given by:

$$F_t = \frac{dp_t}{ds} = \frac{d(mv_t)}{ds} = \frac{mdv_t}{ds} = ma_t \qquad (13)$$

Table 1 refer to one- dimensional of physical time quantities for kinematical and dynamical movement with different symbols and units. When the numerical values is substituted in the dimensional and time equations, the produced values are coincidence to interpretation the physical phenomena in two side dimensionally and timely.

Ex :Dynamic particle have data: v_{1x}=3cms^{-1},x=18cm, a_x= 2cms^{-1}, m=5gm, find : v_{2x}, t , v_{2t} , a_t, F_t, w_t, p_t.

Solution:
v_{2x}=9cms^{-1}, t= 3s ,v_{2t}=0.111scm^{-1}, a_t = 0.0123 scm^{-2}, F_t = 0.0615gm.s.cm^{-2} , W_t =0.1845 gms^{2}cm^{-2} , p_t = 0.8333 gm.scm^{-1}

2- The Lorentz - Einstein transformations:

The relative uniform translational and rotational time velocities are derived from the known dimension velocity equations. The Lorentz - Einstein transformations are converted by the principle formula(reciprocal)[13].
The three equations give another Galilean rule of a particle as measured with time velocity by two observers in relative translational motion is given b

$$V'_{tz'} = V_{tz} \quad V'_{ty'} = V_{ty}, \qquad V'_{tx'} = \frac{V_{tx} v_{tx}}{v_{tx} - V_{tx}} \tag{14}$$

For two observers have the same time acceleration the equations are[14]:

$$a_{tx}{}' = \frac{V_{tx}{}^2 a_{tx}{}'' - v_{tx}{}^2 a_{tx}}{(v_{tx} - V_{tx})^2}, a_{ty}{}' = \frac{dV_{ty}}{dy}, a_{tz}{}' = \frac{dV_{tz}}{dz}$$

The dimension and time velocity of A as measured by o has components[14]:

$$V_{tx} = \frac{dt}{dx}, V_{ty} = \frac{dt}{dy}, V_{tz} = \frac{dt}{dz} \; V_x = \frac{dx}{dt}, V_y = \frac{dy}{dt}, V_z = \frac{dz}{dt} \tag{15}$$

Similarly, the components of distance and time velocities of A as measured by o$^/$ are

$$V'_{x'} = \frac{dx'}{dt'}, V'_{y'} = \frac{dy'}{dt'}, V'_{z'} = \frac{dz'}{dt'}, V'_{t'x'} = \frac{dt'}{dx'}, V_{ty} = \frac{dt}{dy}, V_{tz} = \frac{dt}{dz} \tag{16}$$

3- Reciprocal of Mass Density and pressure

Specific volume is the volume occupied by a unit of mass of a material[15]. The specific volume of a substance is equal to the reciprocal of its mass density. Specific volume may be expressed in m^{3}kg^{-1}:

$$v = \frac{V}{m} = \frac{1}{\rho} \tag{17}$$

where, V is the volume, m is the mass and ρ is the density of the material.

For an ideal gas, pressure is equal to the reciprocal of volume with constant=NkT[16]:

$$p = \frac{c}{V} \tag{18}$$

Table 1. The derived mechanical time quantities and its description and equations.

Derived Time quantity	Description	SI units	equation	Comments
Time Angular Velocity	change in time angular velocity per unit angle .	s rad^{-1}	$\omega_t = \frac{dt}{d\theta}$	scalar or pseudovector
Time Angular Acceleration	Product of an object's mass and time velocity .	s rad^{-2}	$\alpha_t = \frac{d\omega_t}{d\theta}$	scalar
Time Linear Momentum	Measure of the extent and direction of object rotates at time.	kg sm^{-1}	$P_t = mv_t$	Vector, extensive
Time Angular Momentum	The cause of time acceleration, acting on an object.	kgs^3	$L_t = mt^2\omega_t$	conserved quantity, pseudo vector
Time Impulse	Inertia of an object with respect to angular acceleration.	N_t s	$I_{mp} = F_t\, t$	scalar
Time Torque (moment of force)	Energy dissipated by a time force moving over a time moment, scalar product of the time force and the time.	Nt m	$\tau_t = rF_t$	tensor
Time Work	The capacity of a body or system to do time work.	J_t = kg s^2m^{-2}	$W_t = F_t\, t$	scalar
Time Kinetic Energy	The rate of change in energy over time.	Joule (J = kg s^2m^{-2})	$E_t = \frac{1}{2}mv_t^{\,2}$	extensive, scalar, conserved quantity
Time potential Energy	The conserved energy over time	(Jt = kgs^2m^{-2})	$E_{pt} = mg_t t$	scalar
Time Pressure	Amount of time force exerted per surface area.	kg s m^{-4}	$P_t = \frac{F_t}{A}$	intensive
Time Weight	Amount of gravitation force exerted on an object.	Newton (N = kg m s^{-2})	$w_t = mg_t$	scalar
Time Moment of Inertia	Product of a time force and the perpendicular distance	kg m^2	$I = mr^2$	tensor
Time Power	Amount of time force per unit area.	$watt_t$ (W_t)	$P_t = \boldsymbol{F_t v_t}$	scalar or pseudovector

4-Reciprocal of electric current and conductance

The law of dimensional electric current is defined as[16]:

$$I_x = \frac{dQ}{dt} \quad (19)$$

The reciprocal electric current is called time electric current that defined as the rate time to passing unit charge:

$$I_t = -\frac{dt}{dQ} \quad (20)$$

The negative sign refers to compare more than one value of the current, so :

$$I_x = -I_t^{-1} \quad (21)$$

The absolute value of equation (20) becomes $I_x=I_t^{-1}$.

This follows the displacement and time current densities J_x and J_t related to two equations by using amount of electric current flowing through a surface:

$$J_x = \frac{I_x}{A}, J_t = \frac{I_t}{A} \quad (22)$$

In Amp. cm^{-2} and $Amp^{-1}.cm^{-2}$ respectively .

The reciprocal of electric conductance is equal to resistance (in Ohm), also the reciprocal of impedance is equal to admittance (Ohm^{-1}), the reciprocal of dimension electrical conductivity is a measure of how well a material accommodates the transport of electric charge and equal to dimension resistivity or specific resistance:

$$\sigma_t = \frac{1}{\rho_t} \quad \text{and} \quad \sigma_x = \frac{1}{\rho_x} \quad (23)$$

Dimensional electrical resistance is a measure of the degree to which an electrical component opposes the passage of displacement current. It is the ratio of the potential difference (i.e. voltage) across an electric component (such as a resistor) to the displacement or time current passing through that component:

$$R_x = \frac{V}{I_x} \quad \text{and} \quad R_t = \frac{V}{I_t} \quad (24)$$

Where R_x is the resistance of the component. V the voltage across the component, measured in volts, I_x *and* it is the dimension and time current passing through the component,, V can either be measured directly across the component or calculated from a subtraction of voltages relative to a reference point. Resistance is thus a measure of the component's opposition to the flow of electric charge. Its reciprocal quantity is electrical conductance measured in siemens. electrical admittance(1/*Z*) is equal to reciprocal of electric impedance in Siemens (or) mhos Strength of the electric field[16]:

$$E_x = -\frac{dV}{dx}(\mathrm{Vm^{-1}}) \text{ (vector field)} \quad (25)$$

$$R_t = \frac{l}{\sigma_t A}, R_x = \frac{l}{\sigma_x A} \quad (26)$$

$$, E_t = -\frac{dV}{dt} \ (\mathrm{Vs^{-1}}) \quad (27)$$

$$\frac{E_t}{E_x} = v_x \quad (28)$$

Electrical conductance is a measure of current flows through a material:

$$G = \frac{1}{\rho} \text{ siemens (scalar) } (\mathrm{S = A^2\, s^3 kg^{-1}\, m^{-2}}) \quad (29)$$

is Measure for the resistance of an electrical circuit against an alternating current. ohm ($\Omega = \mathrm{kg\ m^2 A^{-2}\ s^{-3}}$) Impedance

$$Z_x = \frac{V}{I_x} \text{ (complex scalar)} \quad (30)$$

The degree to which an object opposes the passage of an electric current is called resistance(scalar)

$$R = \frac{1}{conduc\cdot} \quad (31)$$

The displacement electric power in watts produced by an dimension electric current I_x consisting of a charge of *Q* coulombs every *t* seconds passing through an electric potential (voltage) difference of *V* is:

$$P_x = \frac{QV}{t} = QE_t \quad (32)$$

$$P_t = \frac{Vt}{Q} = \frac{V}{I_x}$$

Divide eq.(29) and (30) produce :

$$\frac{P_x}{P_t} = I_x^{\ 2} \quad (33)$$

Ex. A charge 6 μcoul. is passing through wire at 2μs, its length and area is 2cm and $10cm^2$ respectively ,if the potential difference is 3volt. Calculate I_x, I_t ,J_x, J_t, σ_x, σ_t, E_x, E_t, v_t,v_x.

Solution: I_x=3Amp.., I_t=0.333Amp^{-1} ,J_x=0.3Amp.cm^{-2}, J_t=0.0333$A^{-1}cm^{-2}$, σ_x=0.2Ohmcm$^-$, ,σ_t=0.0222 A.Voltcm^{-1}, E_x=1.5Volt.cm^{-1}, E_t=1.5 *10^6Volt.s^{-1}, v_t=E_x/E_t =10^{-6}scm^{-1},v_x=10^6cms.
The time equations of electric quantities and its derivatives are shown in table 2.

Table 2 represents the description and equations of derived time electric quantities.

Derived time quantity	Description	SI units	equation	comments
Time Electric Field Intensity	.The time force per charge when placed in the electric field.	$Kg.sm^{-2}C^{-1}$	$E_t = \frac{F_t}{Q}$	scalar
Time Electric Flux Density	Is due to time electric field depend on medium	$C.s^3m^{-3}$	$D_t = \varepsilon E_t$	scalar
Time Electric Flux	Electric flux in terms of electric flux density	$C.s^4.m^{-3}$	$\psi_t = \int D_t dt$	scalar
Electric Potential	The time work done in displacing the charge by dl.	Volts	$V = \int E_t dt$	scalar
Time Power Density	The potential difference per unit displacement current.	$V.s.C^{-1}$	$P_t = VI_t$	scalar
Electric charge density	Amount of electric charge per unit volume.	C m^{-3}	$\rho_v = \frac{q}{v}$	intensive
Energy density	Amount of energy per unit volume.	J m^{-3}	$\rho_E = \frac{E}{v}$	intensive

Results and Discussion

The principle problem of kinematics is that of determining all characteristics of a particle as a whole or any of particles or bodies [1]. It was noted that the reciprocal of dimension velocity is equivalent to the gradient of elapsed time that is also defined velocity of time. The negative sign of equation (4) means that the effective numerical value of both v_x and v_t have the same concept for the moving particle. Equation (4) is similar to electrical field equation ($\mathbf{E} = - \nabla\varphi$). The time acceleration of equation (7) is analogous to Poisson's equation ($\nabla^2\varphi$=- ρ/ε) [14].

Figure 1 indicates any postulated values of v_x and v_t that described the symmetry relationship of dimension and time velocities which represent the reciprocal diagram. The negative inverse proportional relation between v_r and v_t, have the same kinetic meaning as a numerical value for a particle motion. They are a symmetry about origin. If we have taken any numerical value of v_x or v_t will have the same numerical velocity meaning, or there are no difference between the new factors related to time and the ordinary factors due to dimension to know the moving values of particle. Figure 2 describes the relationship between the dimension acceleration and time acceleration of moving particle with initial and final dimension or time velocity by applying equations (11) and (12).The curve tend to the slowness for time acceleration. So when the dimension acceleration increases ,the time acceleration decrease in its value and occur the slowness state. Figure 3 shows the relationship between the dimension force and time force , It is found that F_t begins to decrease with respect to F_x ,also for dimension and time work describe the same variation as shown in figure 4. The postulated values were applied for moving particle in straight line by using equations as shown in table 1.

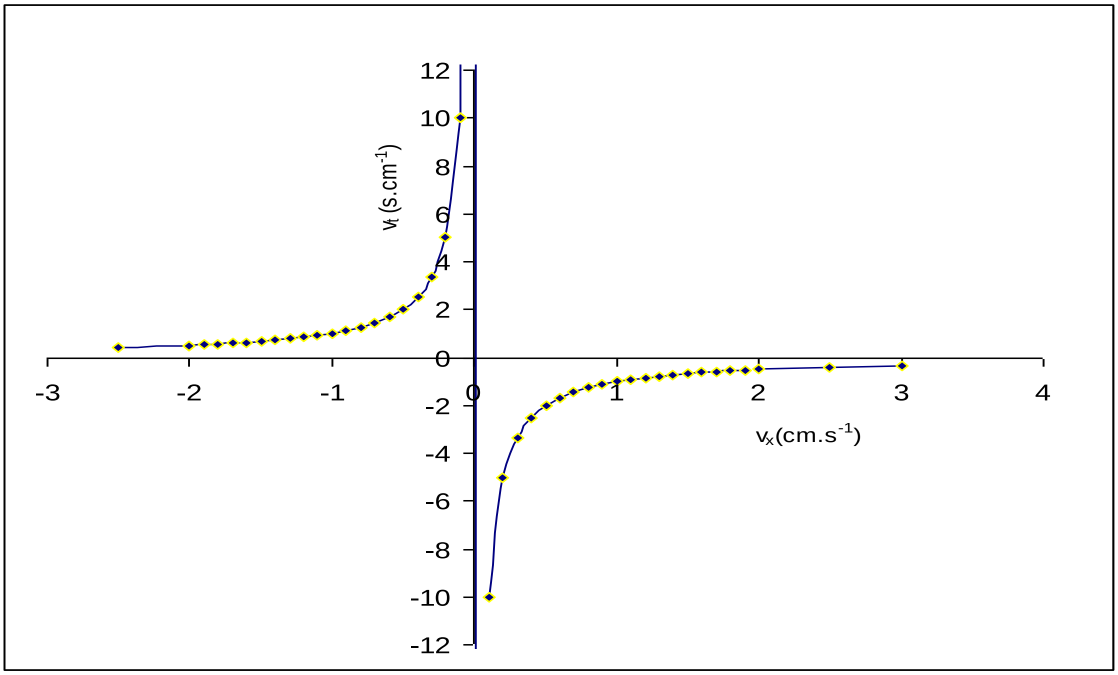

Fig.1 The relationship between velocity and its reciprocal for postulated values.

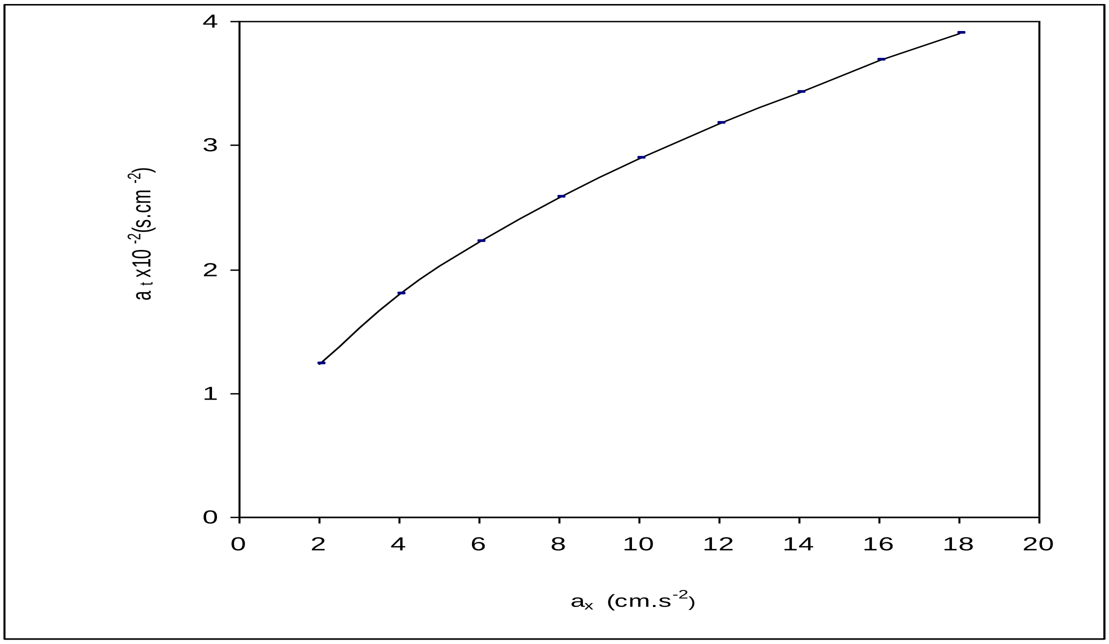

Fig. 2 time acceleration versus dimension acceleration of postulated values.

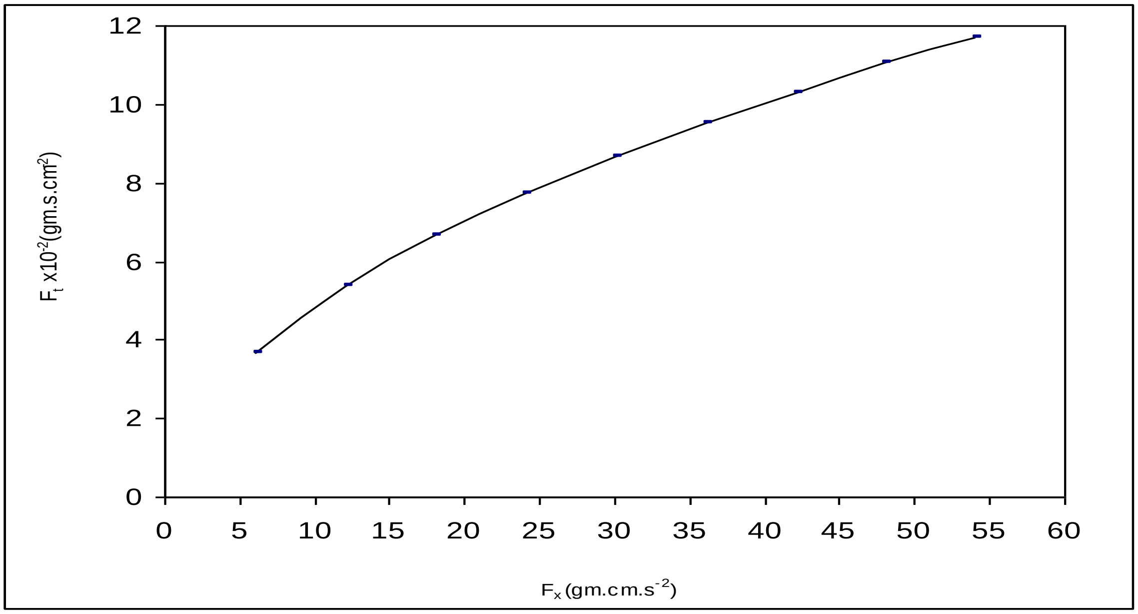

Fig.3 time force versus dimension force of postulated values.

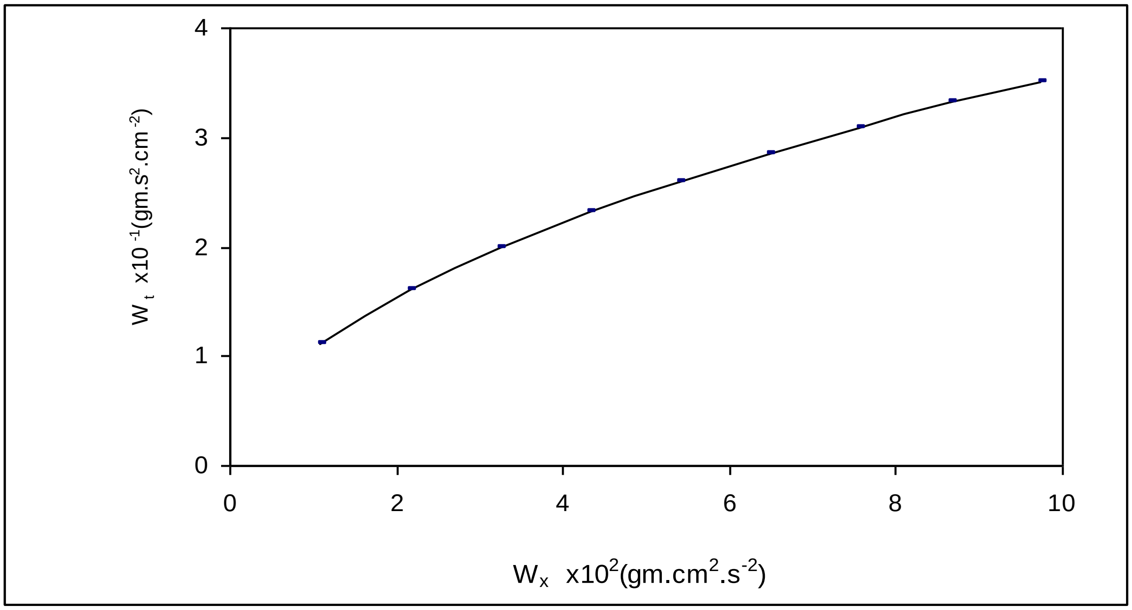

Fig.4 time work versus dimension work of postulated values.

Figure 5 referees to the inversely relationship between the dimension resistivity and its reciprocal(conductivity) of range three types of materials (conductors, semiconductors, and insulators)[17] . The reciprocal relation is valid to find the numerical values of each other. The concept of conductance and resistance is coincidence to give values, that any value is adopted at apply the equation in practical parts.

Figure 6 shows the relationship between E_x and E_t that is linear or no slowness is existence in the path of the time electric field, because the path of the field is different of the path of the particle.

Figure 7 shows the relationship between the dimension and time current densities of any postulated values of moving charge in conductor. Also no slowness in time current density. Figure 8 describes the time power and dimension power that represents a curve .

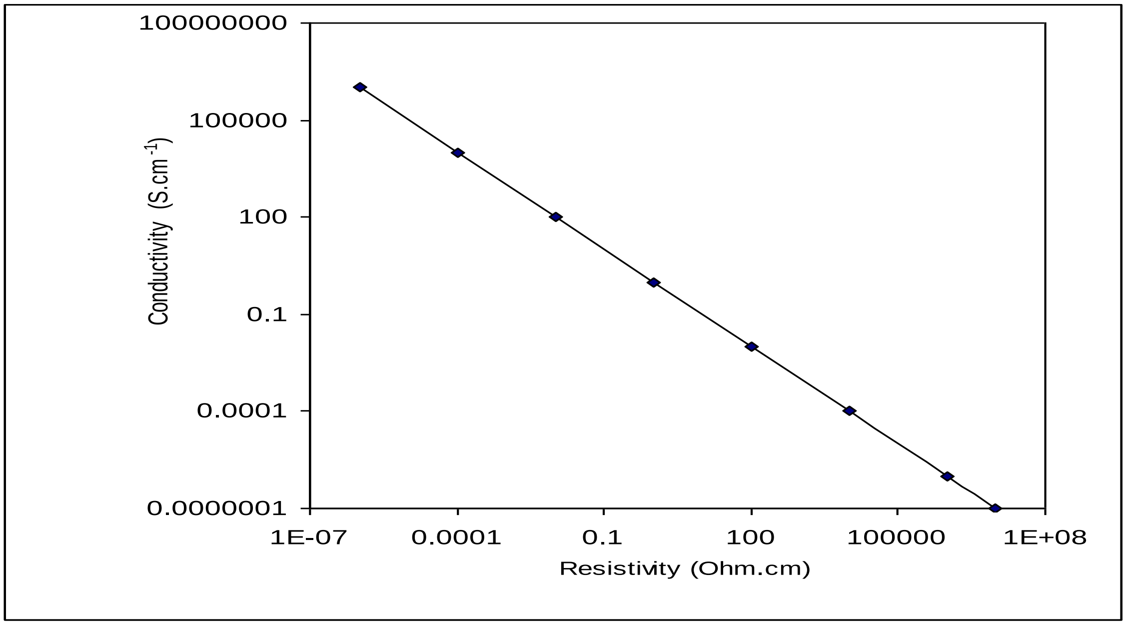

Fig. 5 The inversely relation between the resistivity and its reciprocal of materials.

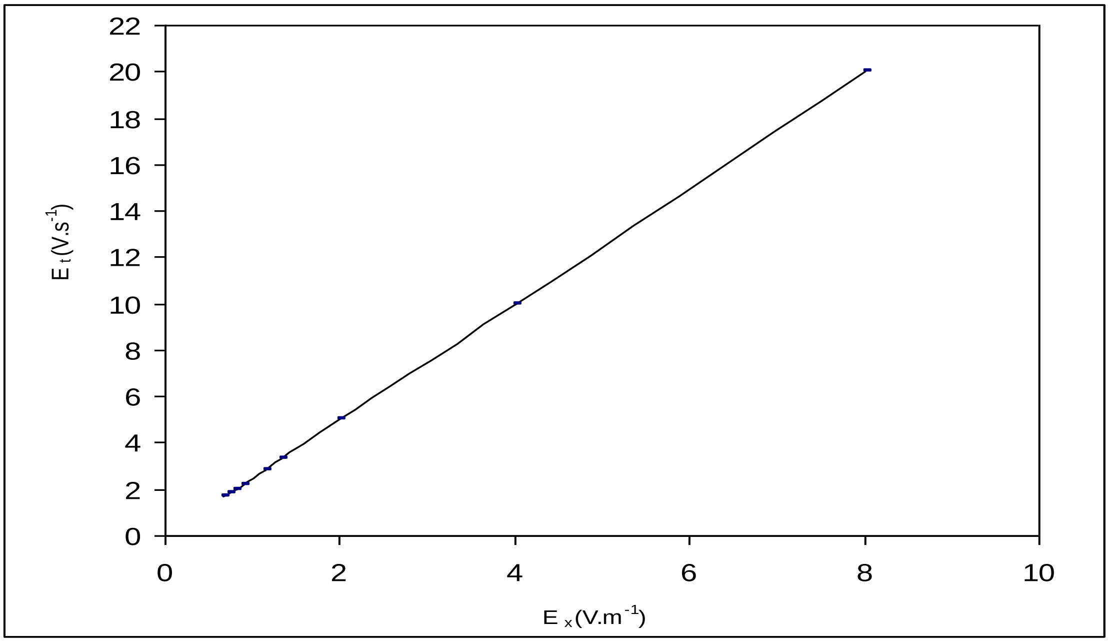

Fig. 6 time electric field versus dimension electric field of any postulated values.

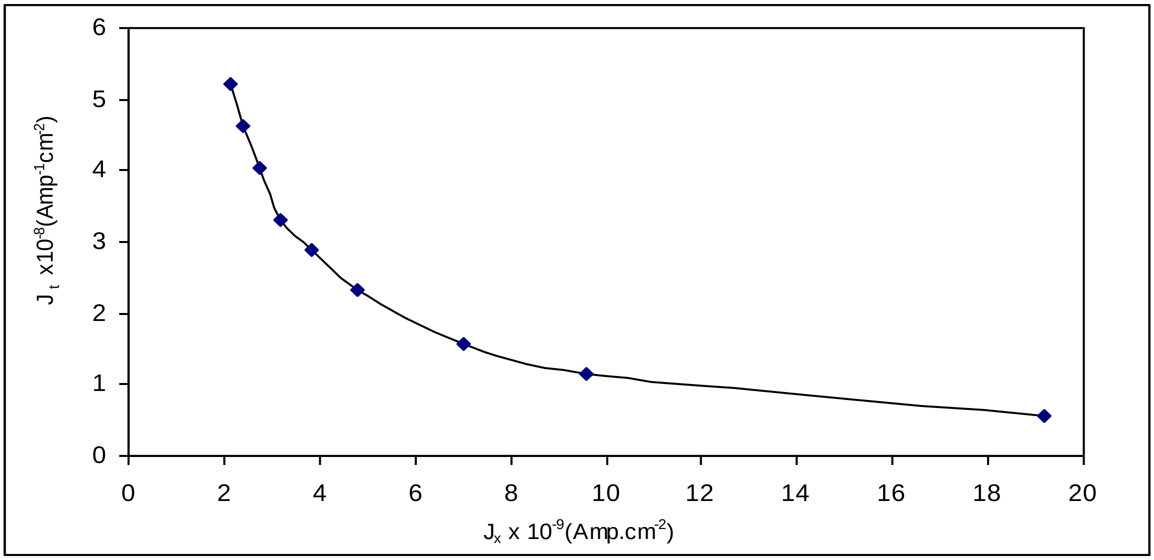

Fig. 7 time current density versus dimension current density of postulated values.

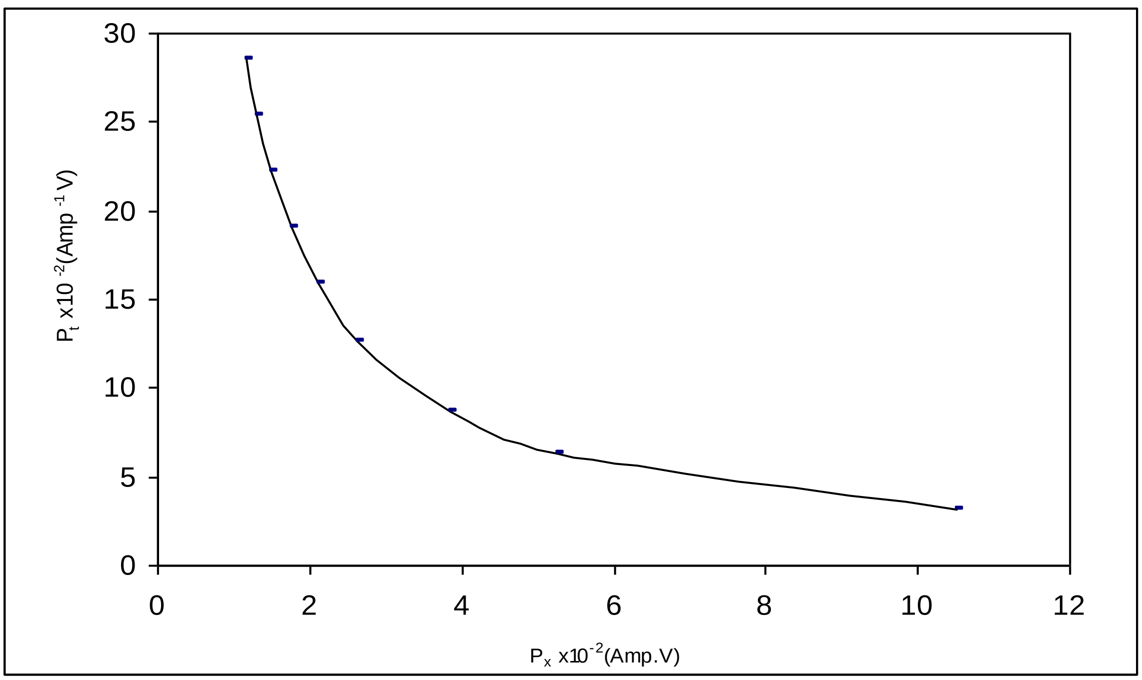

Fig. 8 time power versus dimension power of any postulated values.

It is the perfect association of conformal-conjugate transformation for a moving particle using a new manner can be applied for another movements such as curvilinear, circular, and rotational motion by using the reciprocal of the quantity. The ability to generalize these new equations is realized by using the same previous steps. Most mechanical instruments and equipment are design to measure the factors of particle or body using dimension equations. In spite of involving timer or any device due to time, it is possible to design equipment due to time equations. The new factors involve more accurate units such as micro and nanometer with large units (e.g. ns/m, μs/cm). However the unknown value can be evaluated from one of two types of equations. It must take into account the sign of numerical values for time velocity or time acceleration. The concept of reciprocal velocity or momentum space is important for the classification of electron states in a crystal with respect to time or space. Indeed, the position of an electron cannot be obtained. However, the momentum of an electron can be measured exactly due to uncertainty principle . It is thus clear that we can work with electron states by indexing them in reciprocal space.

We can produced the reciprocal quantities due to electromagnetic, optical and thermal equations for example : the types of reciprocity due to the focal length of a lens in meters is called power of a lens And the reciprocal of wave number is equal to wavelength . Also the reciprocal of elasticity is the compressibility. The reciprocal of time wave (period)is equal to the frequency. The reciprocal of electric field is equal to the optical non-linear coefficient. That the application of computational values in the new equations for calculation does not contradict with the values in the basic equations, so calculation values give a new concept in a deeper movement. The function of distance and time are the elements that determine the movement of the particle, if we adopted a function of time or a function of distance. There is no difficulty in determining the direction of the movement. So it was noted that an inverted quantity may be independent of time or be based on time and in both cases no contradiction with the concept of the movement of the particle, It is the concept of inverted quantitative directional, whether or numerical might infer new quantities. In electrical dynamics laws, it is observed that the applicability of the concept of new quantity between conductivity and resistivity has given physics concepts for material resistance to the movement of the electron, which we concluded the concept of time current is the reciprocal of dimension current(basically current) that meant the time required for the passage a unit charge . Also the same case apply for time current density by applying any numerical values assumed m the results will be valid in light of the movement of an electron in material.

Conclusions

1-The reciprocal of dimension velocity has a new formula called time velocity with the same direction. It is a gradient of time for a moving particle. The time acceleration is the Laplacian operator of time, which is a non-vector quantity .The linear and rotational time equations have another new style to evaluate the parameters of moving particle, moreover involving a new concept of a moving particle and design instrument related to time.

2- Many equations of relative time velocity compatible with relative dimension velocity are produced to describe the translational and rotational relative motion of a body due to Galilean and Lorentz transformations.

3- The reciprocal of some electric quantities and its derivatives give a wide knowledge of moving charges related to dimensionally and timely. The values that substituted in the two class laws don't change the numerical values.

4- The values that substituted in the laws of mechanical and electrical quantities either dimensionally or timely contribute to give wide range of knowledge the phenomenon of all factors.

References

1- Mushfiq Ahmed, J. Sci. Res. **1** (2), 270-274,(2009),Depart. of Phys., Rajshahi, Univ.(6205),Bangladesh.

2- Mushfiq Ahmed, “Discrete and Continuous Representation of the same Motion”, Physics Essay, Vol.**22** No. 1 March,(2009).

3- MD SHAH ALAM,M.H.AHSAN, and MUSHFIQ AHMED,” Mixed Number Lorentz Transformation”, J. Natn. Sci. Foundation, Sri Lanka,(2005),**33**(1):43 – 49.

4- Mushfiq Ahmed, International Journal of Applied Physics and Mathmatics, (2012) Vol.2(5): 336-337 ISSN:2010-362X.

5- L.A. Rasmussem,”Calculation of a Velocity Distribution from Particle Trajectory End Points”, Journal of Glaciology, Vol.29 No.102, USA,(1983).

6- Victor Felix de Bottan, ”Theorem of Movement”, Kaplan Place 12,Beersheva 87288,ISDN,(2006).

7-Larry Andrew, Ronald Philips, (Mathematical Techniques for Engineers and Scientists), International, Society for Optical Engineering,(Publication April, Published by SPIE, the 2003).

8-Benjamin Clifford, Queen Mary & Westfield College (Newton’s Principia) M. Sc. Project for Submission 30th.April, (2001).

9-(Foundations of Computational Mathematics), FCM (2002), Minneapolis, 5-14, Classification Problems in Germany, M. Anderson, August (2002).

10-Lim Siow Jin-DXN Institute- Wiseman DXN, 213, Lebuhraya S. A. Halim, 05400,Alor Setar, Kedah, Malaysia, 16 June (2002).

11- Bohren,C. F. and Huffman, D.R. "Absorption and Scattering of Light by Small Particles", Wiley, (1983).

12- F.A.Mustafa,”New Formulation of the Reciprocal of Velocity for Particle Motion” Vol.12,No.3,(2006),J. of Applied and Pure Science of Babylon Univ.

13- F.A.Mustafa, “Uniform Relative Reciprocal Velocity in Lorentz -Einstein Transformations “ ,British J.of Science, Feb. Vol.4(1) ,(2012), British Journal ISSN 2047-3745.

14- Alonso- Finn (Fundamental University Physics) Fifth Printing Addison- Wesely – Company Inc. 1980.

15- Dukhin, A.S. and Goetz, P.J. "Ultrasound for characterizing colloids", Elsevier, (2002).

16- James S. Walker, “Physics”(2002),by Prentic – Hall,Inc.USA.

17- S . M. Sze and Kwok K. Ng” Physics of Semiconductor Devices”, (2007),3rd Edition by Copyright *0* John Wiley & Sons, Inc.