An Introductory Comment on Wave Relativity

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ABSTRACT: *Wave criterion of special and general relativity can be introduced in this paper. A report can be drawn; about wave mechanical relativistic idea in it.*

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I. INTRODUCTION

When a wave can travel in a four-dimensional time space continuum, then its wave equation is $\Diamond^2\psi=0$; where $\Diamond^2$ is a mechanical operator and ψ is wave function. Here operator $\Diamond^2 = \partial^2/\partial x^2_1 + \partial^2/\partial x^2_2 + \partial^2/\partial x^2_3 + \partial^2/\partial x^2_4 = \partial^2/\partial x^2 + \partial^2/\partial y^2 + \partial^2/\partial z^2 - 1/c^2 \cdot \partial^2/\partial t^2$; where c is the velocity of light.

II. INVARIANT OPERATOR

The special theory of relativity shows that operator $\Diamond^2$ is invariant under Lorentz transformation i.e. $\Diamond^2 = \partial^2/\partial x^2 + \partial^2/\partial y^2 + \partial^2/\partial z^2 - 1/c^2 \cdot \partial^2/\partial t^2 = \partial^2/\partial x'^2 + \partial^2/\partial y'^2 + \partial^2/\partial z'^2 - 1/c^2 \cdot \partial^2/\partial t'^2$; where the equations of Lorentz transformation are : $x'=\gamma(x-vt)$, $y'=y$, $z'=z$ and $t'=\gamma\,(t-vx/c^2)$; here $\gamma=(1-v^2/c^2)^{-1/2}$. Thus operator $\Diamond^2$ be called invariant operator. Obviously the operator $\Diamond^2$ can develop a new mode of relativity; then $\Diamond^2$ may be defined as relativistic operator of this new way of relativity. So now relativity can be expressed by operator $\Diamond^2$ in a new mode of algebraic operation.

III. WAVE INVARIANT QUANTITY

If the both sides of relation $\Diamond^2 = \partial^2/\partial x^2_1 + \partial^2/\partial x^2_2 + \partial^2/\partial x^2_3 + \partial^2/\partial x^2_4$ can be multiplied by wave function ψ, then the formulation $\Diamond^2\psi = \partial^2\psi/\partial x^2_1 + \partial^2\psi/\partial x^2_2 + \partial^2\psi/\partial x^2_3 + \partial^2\psi/\partial x^2_4$ is obtained. Now the quantity $\Diamond^2\psi$ may be called wave invariant quantity. This relation can reveal wave interpretation of Special relativity.

IV. INTRODUCTORY WAVE RELATIVITY

However it is known that $\Diamond^2\psi = \partial^2\psi/\partial x^2_1 + \partial^2\psi/\partial x^2_2 + \partial^2\psi/\partial x^2_3 + \partial^2\psi/\partial x^2_4 = 0$. Moreover this equation can reveal an idea about special wave relativity. Actually the above formulation can give a real meaning or a real situation of four-dimensional continuum even if $\Diamond^2\psi$ does not vanish. Moreover this situation can make $\Diamond^2\psi$ as a physically meaningful quantity. It can be done by concept of particular procedure of operator algebra such a way that $\Diamond^2\psi$ is not equal to zero. This is the actual reality of wave relativity especially general wave relativity.

V. GENERAL FORM OF WAVE RELATIVITY

If the unit of time can be considered such a way that c=1 and the time $t = x_4$, then the formulation $\Diamond^2\psi = \partial^2\psi/\partial x^2 + \partial^2\psi/\partial y^2 + \partial^2\psi/\partial z^2 - 1/c^2 \cdot \partial^2\psi/\partial t^2$ gives the form $\Diamond^2\psi = \partial^2\psi/\partial x^2_1 + \partial^2\psi/\partial x^2_2 + \partial^2\psi/\partial x^2_3 - \partial^2\psi/\partial x^2_4$. It is written in this way that $\Diamond^2\psi = \partial/\partial x_1 . \partial\psi/\partial x_1 + \partial/\partial x_2 . \partial\psi/\partial x_2 + \partial/\partial x_3 . \partial\psi/\partial x_3 - \partial/\partial x_4 . \partial\psi/\partial x_4$. Now the above metric may be assumed as a general Riemannian metric of the form $\Diamond^2\psi = \sum^{n=4}_{i,j=1} g_{ij}\, \partial\psi/\partial x_i \partial\psi/\partial x_j$; where g be a symmetric tensor. Here $g_{ij} = <\partial/\partial x_i, \partial/\partial x_j>$ being the coefficients of the above metric form.

VI. CONCLUSION

Thus the wave invariant $\Diamond^2\psi$ can suggest perfect wave criterion of gravity as well as general wave relativity. The situation may be expressed by invention of a new proposed operator algebraic system in four-dimensional continuum to reveal a real and general meaning of $\Diamond^2\psi$ and to define wave relativity. Here special wave relativity is nothing but a specific situation of general wave relativity where $\Diamond^2\psi = 0$. i.e. $\Diamond^2\psi = \sum^{n=4}_{i,j=1} g_{ij}\, \partial\psi/\partial x_i \partial\psi/\partial x_j$ for general wave relativity and $\Diamond^2\psi = \sum^{n=4}_{i,j=1} g_{ij}\, \partial\psi/\partial x_i \partial\psi/\partial x_j = 0$ for special wave relativity. However the latter metric form may be considered as a form of Euclidian metric.

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