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Formulation of Wave Tensor in Wave Metric to Reveal Wave Gravity

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Abstract:- In this paper, the preliminary concept about wave gravity can be expressed by the description of wave metric tensor is reported. This new metric (wave metric) can deduce gravitational field by the way of wave existence in nature.

Keywords:- Wave Relativity, Euclidean and Riemannian Metric, Metric Tensor, Matrix and Determinant, Wave Gravity.

I. INTRODUCTION

The formulation of special wave relativity is $\Diamond^2\psi = d^2\psi/dx^2 + d^2\psi/dy^2 + d^2\psi/dz^2 - 1/c^2.d^2\psi/dt^2$; where $\Diamond^2\psi$ wave invariant. Moreover when the spatial coordinates $x=x_1$, $y=x_2$, $z=x_3$ and the time $t=x_4$, the above relation can take the form $\Diamond^2\psi = d^2\psi/dx_1^2 + d^2\psi/d\,x_2^2 + d^2\psi/d\,x_3^2 - 1/c^2.d^2\psi/d\,x_4^2$. Now if c=1, then $\Diamond^2\psi = d^2\psi/dx_1^2 + d^2\psi/dx_2^2 + d^2\psi/dx_3^2 - d^2\psi/dx_4^2 = d/dx_1.d\psi/dx_1 + d/dx_2.d\psi/dx_2 + d/dx_3.d\psi/dx_3 - d/dx_4.d\psi/dx_4$. In general wave relativity, this formulation goes over into the form of a general metric as $\Diamond^2\psi = \sum_{ij}g_{ij}\, d\psi/dx_i d\psi/dx_j$; where g_{ij} is a metric tensor.

II. WAVE METRIC TENSOR

If the metric used in special wave relativity is denoted by η^* (coefficients of the metric), then the matrix representation of η^* is

$$\eta^* = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & -1/c^2 \end{pmatrix}$$

On the other hand in general wave relativity, g_{ij} is a symmetric tensor (coefficients of the metric). i.e. $g_{ij} = g_{ji}$; where g_{ij} can be represented as

$$g_{ij} = \begin{pmatrix} g^*_{11} & g^*_{12} & g^*_{13} & g^*_{14} \\ g^*_{21} & g^*_{22} & g^*_{23} & g^*_{24} \\ g^*_{31} & g^*_{32} & g^*_{33} & g^*_{34} \\ g^*_{41} & g^*_{42} & g^*_{43} & g^*_{44} \end{pmatrix} = \begin{pmatrix} d/dx_1 & 0 & 0 & 0 \\ 0 & d/dx_2 & 0 & 0 \\ 0 & 0 & d/dx_3 & 0 \\ 0 & 0 & 0 & -d/dx_4 \end{pmatrix}$$

Here g_{ij} is the fundamental tensor of general wave relativity. The metric summation consists all index combinations from 1,1 to 4,4.

III. COVARIANT AND CONTRAVARIANT WAVE TENSOR

In general wave metric, wave invariant relation is $\Diamond^2\psi = g_{\alpha\beta}\, d\psi/dx_\alpha d\psi/dx_\beta$ (Summed over α and β); where $g_{\alpha\beta} = \langle d/dx_\alpha, d/dx_\beta \rangle$ in which d/dx_α and d/dx_β are specific vector fields. As well as $d\psi/dx_\alpha$ and $d\psi/dx_\beta$ are covariant expressions of wave coordinates. Here $g_{\alpha\beta}$ is the covariant wave tensor which is symmetric tensor i.e. $g_{\alpha\beta} = g_{\beta\alpha}$. Now if the co-factor of each element of $g_{\alpha\beta}$ can be divided by the determinant $g = |g_{\alpha\beta}|$ deduced by the elements of $g_{\alpha\beta}$, then new tensor $g^{\alpha\beta}$ is obtained; which is the contravariant wave tensor. It is also a symmetric tensor i.e. $g^{\alpha\beta} = g^{\beta\alpha}$.

However in this respect, it may be assumed that $\Diamond^2\psi = g_{\alpha\beta}\, d\psi^{\alpha}/dx d\psi^{\beta}/dx$; where $d\psi^{\alpha}/dx$ and $d\psi^{\beta}/dx$ are contravariant expressions of wave coordinates. Moreover in a situation of symmetric tensor product, it may be also considered that $d\psi^{\alpha}/dx d\psi^{\beta}/dx = d\psi^{\beta}/dx d\psi^{\alpha}/dx$.

IV. WAVE INVARIANT IN WAVE METRIC

Here the metric used in special wave relativity is a Euclidean metric; which possesses a linear transformation of wave coordinates in $\Diamond^2\psi$ and the metric used in general wave relativity is a Riemannian metric; which possesses a non-linear transformation of wave coordinates in $\Diamond^2\psi$. However wave invariant $\Diamond^2\psi$ expresses information about wave interpretation of space-time continuum. In this respect, three specific conditions may be arise for $\Diamond^2\psi$ in mode of above non-linear transformation i.e. $\Diamond^2\psi < 0$, $\Diamond^2\psi = 0$ and $\Diamond^2\psi > 0$. These conditions can introduce wave relativistic criterion of space-time in three different ways.

However in course of discussion, it may be discussed that the formulation $\Diamond^2\psi = g_{\alpha\beta}\, d\psi/dx_{\alpha} d\psi/dx_{\beta}$ can be transformed back into the relation $\Diamond^2\psi = d/dx_1.d\psi/dx_1 + d/dx_2.d\psi/dx_2 + d/dx_3.d\psi/dx_3 - d/dx_4.d\psi/dx_4 = d^2\psi/dx_1^2 + d^2\psi/d\, x_2^2 + d^2\psi/d\, x_3^2 - d^2\psi/d\, x_4^2$ by particular transformation of wave coordinates.

V. CONCLUSION

The matrix representation of wave metric tensor g_{ij} can reveal that the covariant wave tensor $g_{\alpha\beta}$ and the contravariant wave tensor $g^{\alpha\beta}$ can express certain relations of vector fields $d/dx_1 \ldots d/dx_4$. If it may considered that g_{ij} can express both the metric properties and the characteristics of gravitational field, then these new relations of vector fields can draw a system of new metric (wave metric) which is nothing but the metric of wave gravity.

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REFERENCES

[1]. U.Dolai, *An Introductory Comment on Wave Relativity*, International Journal of Modern Engineering Research (IJMER), vol.3, Issue. 5, PP-3041-3041 (Sep-Oct. 2013).

[2]. H.A. Lorentz et al., *The Principle of Relativity*, trans. W. Perrett and G.B. Jeffery (Methuen, 1923; Dover rpt., 1952).