212(1): Refutation of the Einsteinian General Relativity by Coordinate Transformation.

It has been proven that the connection is antisymmetric. This fact of geometry refutes the Einsteinian general relativity (EGR) because in EGR the connection is incorrectly symmetric. The connection under coordinate transformation becomes:

$$\Gamma^{\nu'}_{\mu'\lambda'} = \frac{\partial x^{\mu}}{\partial x^{\mu'}} \frac{\partial x^{\lambda}}{\partial x^{\lambda'}} \frac{\partial x^{\nu'}}{\partial x^{\nu}} \Gamma^{\nu}_{\mu\lambda} - \frac{\partial x^{\mu}}{\partial x^{\mu'}} \frac{\partial x^{\lambda}}{\partial x^{\lambda'}} \frac{\partial}{\partial x^{\mu}} \left(\frac{\partial x^{\nu'}}{\partial x^{\lambda}} \right). \quad -(1)$$

It has been proven in previous work that:

$$\Gamma^{\nu'}_{\mu'\lambda'} = - \Gamma^{\nu'}_{\lambda'\mu'}. \quad -(2)$$

However,

$$\frac{\partial}{\partial x^{\mu}} \left(\frac{\partial x^{\nu'}}{\partial x^{\lambda}} \right) = \frac{\partial}{\partial x^{\lambda}} \left(\frac{\partial x^{\nu'}}{\partial x^{\mu}} \right). \quad -(3)$$

It follows that in eq. (1):

$$\frac{\partial x^{\nu'}}{\partial x^{\lambda}} = 0 \quad -(4)$$

i.e. the connection cannot have a symmetric component in any frame. To prove eq. (4) consider:

2)

$$\Gamma^{a}_{\mu\lambda} = \Gamma^{\nu}_{\mu\lambda} q^{a}_{\nu} \quad -(5)$$

in Cartan geometry. Then:

$$\Gamma^{a'}_{\mu'\lambda'} = \frac{\partial x^{\mu}}{\partial x^{\mu'}} \frac{\partial x^{\lambda}}{\partial x^{\lambda'}} \frac{\partial x^{a'}}{\partial x^{a}} \Gamma^{a}_{\mu\lambda} - \frac{\partial x^{\mu}}{\partial x^{\mu'}} \frac{\partial x^{\lambda}}{\partial x^{\lambda'}} \frac{\partial}{\partial x^{\mu}} \left(\frac{\partial x^{a'}}{\partial x^{\lambda}} \right) \quad -(6)$$

It must be proven that:

$$\frac{\partial x^{a'}}{\partial x^{\lambda}} = 0. \quad -(7)$$

Note that:

$$\frac{\partial x^{a'}}{\partial x^{\lambda}} = \frac{\partial x^{a'}}{\partial x^{b'}} \frac{\partial x^{b'}}{\partial x^{\lambda}} \quad -(8)$$

and that the following Cartan tetrads are defined by:

$$x^{a'} = q^{a'}_{\mu'} x^{\mu'} \quad -(9)$$

$$x^{b'} = q^{b'}_{\mu'} x^{\mu'} \quad -(10)$$

So

$$\frac{\partial x^{a'}}{\partial x^{b'}} = q^{a'}_{\mu'} q^{\mu'}_{b'} \quad -(11)$$

Cartan geometry is defined by:

$$q^a_\mu q^\mu_b = \delta^a_b \quad -(12)$$

and

$$q^\mu_a q^a_\nu = \delta^\mu_\nu \quad -(13)$$

where:

$$\delta^a_b = 0 \text{ if } a \neq b. \quad -(14)$$

So it follows that:

$$\frac{\partial x^{a'}}{\partial x^{b'}} = 0 \quad -(15)$$

and

$$\Gamma^{a'}_{\mu'\lambda'} = \frac{\partial x^\mu}{\partial x^{\mu'}} \frac{\partial x^\lambda}{\partial x^{\lambda'}} \frac{\partial x^{a'}}{\partial x^a} \Gamma^a_{\mu\lambda} \quad -(16).$$

Q.E.D.

The antisymmetric Christoffel connection transforms as a tensor.

Using eq. (5):

$$\boxed{\Gamma^{\nu'}_{\mu'\lambda'} = \frac{\partial x^\mu}{\partial x^{\mu'}} \frac{\partial x^\lambda}{\partial x^{\lambda'}} \frac{\partial x^{\nu'}}{\partial x^\nu} \Gamma^\nu_{\mu\lambda}} \quad -(17)$$

The spin connection $\omega^a_{\mu b}$ also transforms as

4) a tensor:

$$\omega^{a'}_{\mu' b'} = \frac{\partial x^{a'}}{\partial x^{a}} \frac{\partial x^{b'}}{\partial x^{b}} \frac{\partial x^{\mu}}{\partial x^{\mu'}} \omega^{a}_{\mu b} \quad -(18)$$

<u>The tetrad postulate</u> is:

$$D_\mu q^a_\nu = \partial_\mu q^a_\nu + \omega^a_{\mu\nu} - \Gamma^a_{\mu\nu} = 0 \quad -(19)$$

and is true in any frame of reference, so:

$$D_{\mu'} q^{a'}_{\nu'} = 0. \quad -(20)$$

Denote:

$$\Omega^a_{\mu\nu} = \Gamma^a_{\mu\nu} - \omega^a_{\mu\nu} \quad -(21)$$

then

$$\partial_{\mu'} q^{a'}_{\nu'} = \Omega^{a'}_{\mu'\nu'} \quad -(22)$$

<u>also transforms as a tensor.</u>

The consequences of this will be discussed in the next note.