316(6): General Expression of the Cartan Identity in Terms of Vectors.

As first described in UFT254 and UFT255 the Cartan identity splits into two vector equations:

$$\underline{\nabla} \cdot \underline{T}^a(\text{spin}) = \underline{q}^b \cdot \underline{R}^a{}_b(\text{spin}) - \underline{\omega}^a{}_b \cdot \underline{T}^b(\text{spin}) \quad -(1)$$

and

$$\frac{1}{c}\frac{\partial \underline{T}^a(\text{spin})}{\partial t} + \underline{\nabla} \times \underline{T}^a(\text{orb}) \quad -(2)$$
$$= q^b_0 \underline{R}^a{}_b(\text{spin}) + \underline{q}^b \times \underline{R}^a{}_b(\text{orb})$$
$$- \left(\omega^a{}_{0b} \underline{T}^b(\text{spin}) + \underline{\omega}^a{}_b \times \underline{T}^b(\text{orb})\right)$$

where:

$$\underline{T}^a(\text{spin}) = \underline{\nabla} \times \underline{q}^a - \underline{\omega}^a{}_b \times \underline{q}^b \quad -(3)$$

and

$$\underline{T}^a(\text{orb}) = -\underline{\nabla} q^a_0 - \frac{1}{c}\frac{\partial \underline{q}^a}{\partial t} - \omega^a{}_{0b}\underline{q}^b + q^b_0 \underline{\omega}^a{}_b \quad -(4)$$

with

$$\underline{R}^a{}_b(\text{spin}) = \underline{\nabla} \times \underline{\omega}^a{}_b - \underline{\omega}^a{}_c \times \underline{\omega}^c{}_b \quad -(5)$$

and

$$\underline{R}^a{}_b(\text{orb}) = -\underline{\nabla}\omega^a{}_{0b} - \frac{1}{c}\frac{\partial \underline{\omega}^a{}_b}{\partial t} - \omega^a{}_{0c}\underline{\omega}^c{}_b + \omega^c{}_{0b}\underline{\omega}^a{}_c \quad -(6)$$

In order to translate these equations of geometry

2) into equations of electrodynamics are:

$$\underline{B}^a = A^{(0)} \underline{T}^a(\text{spin}) \quad - (7)$$

and

$$\underline{B}^a{}_b = W^{(0)} \underline{R}^a{}_b(\text{spin}) \quad - (8)$$

with

$$\underline{E}^a = cA^{(0)} \underline{T}^a(\text{orb}) \quad - (9)$$

and

$$\underline{E}^a{}_b = cW^{(0)} \underline{R}^a{}_b(\text{orb}) \quad - (10)$$

So we obtain:

$$\underline{\nabla} \cdot \underline{B}^a = \frac{1}{W^{(0)}} \underline{A}^b \cdot \underline{B}^a{}_b - \underline{\omega}^a{}_b \cdot \underline{B}^b \quad - (11)$$

and eq. (2) with:

$$\underline{T}^a(\text{spin}) = \frac{1}{A^{(0)}} \underline{B}^a \quad - (12)$$

$$\underset{\sim}{T}^a(\text{orb}) = \frac{1}{cA^{(0)}} \underline{E}^a \quad - (13)$$

$$\underline{R}^a{}_b(\text{spin}) = \frac{1}{W^{(0)}} \underline{B}^a{}_b \quad - (14)$$

$$\underline{R}^a{}_b(\text{orb}) = \frac{1}{cW^{(0)}} \underline{E}^a{}_b \quad - (15)$$

So the next note will develop eqs. (2) and (12) – (15).