Raising our 4-dimensional uncurved space W to the power ½.

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Abstract

The application of the (1402.0167, 1402.0170 viXra.org) to our 4 – dimensional vector space W when M = 1, L = 2. Cobasics are chosen so that V has simple algebraic and metric tensors.

Let the basis of W is $\vec{e}_\mu$. $W = V \otimes V$ (1)

$$V = W^{1/2} \quad (2)$$

The basis of V is $\vec{n}_\alpha$. $\vec{e}_\mu = e_\mu{}^{\alpha\beta} \cdot \vec{n}_\alpha \otimes \vec{n}_\beta$ (3)

Here $e_\mu{}^{\alpha\beta}$ are the cobasics. We choose the cobasics so :

$$\vec{e}_1 = 1 \cdot \vec{n}_1 \otimes \vec{n}_1 \quad (4)$$
$$\vec{e}_2 = i_1 \cdot \vec{n}_2 \otimes \vec{n}_1 \quad (5)$$
$$\vec{e}_3 = i_2 \cdot \vec{n}_1 \otimes \vec{n}_2 \quad (6)$$
$$\vec{e}_4 = i_1 \cdot i_2 \cdot \vec{n}_2 \otimes \vec{n}_2 \quad (7)$$

New hypercomplex numbers i_1 and i_2 are introduced here :

$i_1 \cdot i_1 = -1$ (8) $i_2 \cdot i_2 = -1$ (9) $i_1 \cdot i_2 = -i_2 \cdot i_1$ (10)

$i \cdot i = -1$ (11) $i \cdot i_1 = i_1 \cdot i$ (12) $i \cdot i_2 = i_2 \cdot i$ (13)

In order to $\vec{e}_\mu$ consist quaternion algebra, $\vec{n}_\alpha$ must satisfy such algebra :

$[\vec{n}_1 \times \vec{n}_1] = \vec{n}_1$ (14) $[\vec{n}_1 \times \vec{n}_2] = \vec{n}_2$ (15)

$[\vec{n}_2 \times \vec{n}_1] = \vec{n}_2$ (16) $[\vec{n}_2 \times \vec{n}_2] = \vec{n}_1$ (17)

And the same with the scalar product :

$(\vec{n}_1, \vec{n}_1) = 1$ (18) $(\vec{n}_1, \vec{n}_2) = 0$ (19)

$(\vec{n}_2, \vec{n}_1) = 0$ (20) $(\vec{n}_2, \vec{n}_2) = 1$ (21)

$(\vec{n}_\alpha, \vec{n}_\beta) = q_{\alpha\beta}$ (22) $[\vec{n}_\alpha \times \vec{n}_\beta] = \vec{n}_\gamma \cdot f^\gamma{}_{\alpha\beta}$ (23)

So we have for V : $q_{\alpha\beta}$ - metric tensor, $f^\gamma{}_{\alpha\beta}$ - algebraic tensor.

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