I have shown [1] the algebra of Octonions doubly covers the xyz representation of physical space. One cover is an arbitrary single choice between the seven possible triplets of vector Octonion basis elements that with the scalar basis element form Quaternion subalgebras. The product of any two of the basis elements in this triplet is within sign the third member, the set is closed for unlike element multiplication. The second cover of xyz is a triplet of vector Octonion basis elements not members of our closed set that are additionally not collectively part of any Quaternion subalgebra. The product of any two basis elements in this set is within sign a member of the closed set. Its multiplication rule is thus open, not closed. Once the closed set is assumed, the open set is determined.

Start with a valid Octonion set of seven cyclic permutations of basis elements defining 42 of the 64 Octonion basis element multiplication rules, such as

$(e_1\ e_2\ e_3)\ (e_7\ e_6\ e_1)\ (e_5\ e_7\ e_2)\ (e_6\ e_5\ e_3)\ (e_5\ e_4\ e_1)\ (e_6\ e_4\ e_2)\ (e_7\ e_4\ e_3)$

Choose e_4 to be the basis element not part of the xyz representation. Gather up the three permutations including the basis element e_4, making sure to cyclically position e_4 centrally.

$(e_5\ e_4\ e_1)$
$(e_6\ e_4\ e_2)$
$(e_7\ e_4\ e_3)$

Basis elements $(e_1\ e_2\ e_3)$ are part of the Quaternion subalgebra (e_0, e_1, e_2, e_3) and appear here on the right side of e_4. Basis elements e_5 e_6 and e_7 are on the left side of e_4, and are not found together in any of the seven original permutations. We will assign an association to the physical x, y and z directions individually to each pair of basis elements associated with the same e_4 in each of these permutations. The xyz : pair mapping at this point is quite arbitrary. Making an extra-algebraic commitment to a particular choice, associate as follows:

Physical $x \rightarrow (e_1, e_5)$
Physical $y \rightarrow (e_2, e_6)$
Physical $z \rightarrow (e_3, e_7)$

This leaves (e_0, e_4) not part of the spatial representation. As I have mentioned previously, the two form a Complex subalgebra for the Octonions, and requiring complex regularity for their calculus (Cauchy-Riemann Equations) on all 8-potential functions the Octonion D'Alembertian and Octonion Analogous Lorentz Condition found in my Octonion cover of Electrodynamics nicely break down to the sum of two 4D recognizable forms along the lines of the above xyz double cover.

With this choice of xyz coverage and the above Octonion Algebra, the open set basis element multiplication rules are indicated by the following permutations

$(e_7\ e_6\ e_1)$
$(e_5\ e_7\ e_2)$
$(e_6\ e_5\ e_3)$

Note the important fact that $(e_1\ e_2\ e_3)$ is xyz right handed and $\{e_5\ e_6\ e_7\}$ is xyz left handed. By this I mean $e_1 * e_2 = +e_3$ but $e_5 * e_6 = -e_3$. The open and closed set triplets will always be opposite handedness for any valid Octonion representation and any choice of non-spatial basis element when the above process is used to identify the two triplets. I must be careful to state that when the algebra changes, this specific association method may associate a different closed triplet set for the non-spatial choice e_4.

There are 16 ways to define the multiplication rules for a given single arrangement of basis elements into 7 permutation multiplication rule triplets. 8 of these ways are "Right Octonion Algebra" and 8 are "Left Octonion Algebra". "Right" algebras will always have a valid permutation triplet to the right and not to the left of any selected basis element in the three permutations that include that element. Conversely "Left" algebras will have a valid permutation triplet only to the left of any selected basis element.

Right **O** Algebra

R0	R1	R2	R3	R4	R5	R6	R7
$(e_1\ e_2\ e_3)$	$(e_1\ e_2\ e_3)$	$(e_1\ e_2\ e_3)$	$(e_1\ e_2\ e_3)$	$(e_3\ e_2\ e_1)$	$(e_3\ e_2\ e_1)$	$(e_3\ e_2\ e_1)$	$(e_3\ e_2\ e_1)$
$(e_7\ e_6\ e_1)$	$(e_7\ e_6\ e_1)$	$(e_1\ e_6\ e_7)$	$(e_1\ e_6\ e_7)$	$(e_1\ e_6\ e_7)$	$(e_1\ e_6\ e_7)$	$(e_7\ e_6\ e_1)$	$(e_7\ e_6\ e_1)$
$(e_5\ e_7\ e_2)$	$(e_2\ e_7\ e_5)$	$(e_5\ e_7\ e_2)$	$(e_2\ e_7\ e_5)$	$(e_2\ e_7\ e_5)$	$(e_5\ e_7\ e_2)$	$(e_2\ e_7\ e_5)$	$(e_5\ e_7\ e_2)$
$(e_6\ e_5\ e_3)$	$(e_3\ e_5\ e_6)$	$(e_3\ e_5\ e_6)$	$(e_6\ e_5\ e_3)$	$(e_3\ e_5\ e_6)$	$(e_6\ e_5\ e_3)$	$(e_6\ e_5\ e_3)$	$(e_3\ e_5\ e_6)$
$(e_5\ e_4\ e_1)$	$(e_5\ e_4\ e_1)$	$(e_1\ e_4\ e_5)$	$(e_1\ e_4\ e_5)$	$(e_5\ e_4\ e_1)$	$(e_5\ e_4\ e_1)$	$(e_1\ e_4\ e_5)$	$(e_1\ e_4\ e_5)$
$(e_6\ e_4\ e_2)$	$(e_2\ e_4\ e_6)$	$(e_6\ e_4\ e_2)$	$(e_2\ e_4\ e_6)$	$(e_6\ e_4\ e_2)$	$(e_2\ e_4\ e_6)$	$(e_6\ e_4\ e_2)$	$(e_2\ e_4\ e_6)$
$(e_7\ e_4\ e_3)$	$(e_3\ e_4\ e_7)$	$(e_3\ e_4\ e_7)$	$(e_7\ e_4\ e_3)$	$(e_7\ e_4\ e_3)$	$(e_3\ e_4\ e_7)$	$(e_3\ e_4\ e_7)$	$(e_7\ e_4\ e_3)$

Left **O** Algebra

L0	L1	L2	L3	L4	L5	L6	L7
$(e_1\ e_2\ e_3)$	$(e_1\ e_2\ e_3)$	$(e_1\ e_2\ e_3)$	$(e_1\ e_2\ e_3)$	$(e_3\ e_2\ e_1)$	$(e_3\ e_2\ e_1)$	$(e_3\ e_2\ e_1)$	$(e_3\ e_2\ e_1)$
$(e_7\ e_6\ e_1)$	$(e_7\ e_6\ e_1)$	$(e_1\ e_6\ e_7)$	$(e_1\ e_6\ e_7)$	$(e_1\ e_6\ e_7)$	$(e_1\ e_6\ e_7)$	$(e_7\ e_6\ e_1)$	$(e_7\ e_6\ e_1)$
$(e_5\ e_7\ e_2)$	$(e_2\ e_7\ e_5)$	$(e_5\ e_7\ e_2)$	$(e_2\ e_7\ e_5)$	$(e_2\ e_7\ e_5)$	$(e_5\ e_7\ e_2)$	$(e_2\ e_7\ e_5)$	$(e_5\ e_7\ e_2)$
$(e_6\ e_5\ e_3)$	$(e_3\ e_5\ e_6)$	$(e_3\ e_5\ e_6)$	$(e_6\ e_5\ e_3)$	$(e_3\ e_5\ e_6)$	$(e_6\ e_5\ e_3)$	$(e_6\ e_5\ e_3)$	$(e_3\ e_5\ e_6)$
$(e_1\ e_4\ e_5)$	$(e_1\ e_4\ e_5)$	$(e_5\ e_4\ e_1)$	$(e_5\ e_4\ e_1)$	$(e_1\ e_4\ e_5)$	$(e_1\ e_4\ e_5)$	$(e_5\ e_4\ e_1)$	$(e_5\ e_4\ e_1)$
$(e_2\ e_4\ e_6)$	$(e_6\ e_4\ e_2)$	$(e_2\ e_4\ e_6)$	$(e_6\ e_4\ e_2)$	$(e_2\ e_4\ e_6)$	$(e_6\ e_4\ e_2)$	$(e_2\ e_4\ e_6)$	$(e_6\ e_4\ e_2)$
$(e_3\ e_4\ e_7)$	$(e_7\ e_4\ e_3)$	$(e_7\ e_4\ e_3)$	$(e_3\ e_4\ e_7)$	$(e_3\ e_4\ e_7)$	$(e_7\ e_4\ e_3)$	$(e_7\ e_4\ e_3)$	$(e_3\ e_4\ e_7)$

The elemental map between "Right" and "Left" types is the negation (swap any 2 permutation elements) of all 3 permutations that include any one element, and the elemental map within types is negation of the 4 permutations that do not include any one element. In the above tables, the map R0 $\rightarrow$ Ra or L0 $\rightarrow$ La is negating all R0 or L0 permutations that do not include the basis element e_a and the map Ra ↔ La is negating the permutations in the source that include e_4. With the above associations with xyz, it is convenient to use e_4 as the element chosen to map between "Right" and "Left", which is what I have done in the organization of the Right and Left Octonion tables above.

If we look at our four cyclic permutations we picked to represent open and closed set xyz multiplication, the xyz handedness represented by their element order varies within and between fundamental Octonion Algebra definitions. Observe that our original choice of algebra was R0 and the juxtaposition of elements in the three permutations including e_4 show (e_1 e_2 e_3) on the right side. Look now at the other R algebras. Notice that all representations have one of our four cyclic permutations we associated with xyz to the right, and each of the four is indicated within two of the eight R algebras. The same applies to all L algebras, but of course now they are now on the left side of e_4. Now compare the xyz handedness of the permutation identified by the three e_4 permutations with the three that are not within that same algebra. They will always have the opposite xyz handedness.

The goal now is to apply Euler Angle methodology worked out originally for physical xyz space to the representation of xyz space within the algebra of Octonions. We want the application to create new bases that are linear combinations only of the basis elements representing spatial xyz; meaning that after all three Euler Angle rotations, the basis set (e_0, e_4) is to carry forward unmodified and neither of the two of these basis elements are found in linear combination with any other basis elements.

It might be helpful to put up the four triplets representing xyz with curly braces such as to not imply a positive/negative multiplication order since as we go, this will change algebra to algebra:

{ x y z }
$\{e_1\ e_2\ e_3\}$
$\{e_1\ e_6\ e_7\}$
$\{e_5\ e_2\ e_7\}$
$\{e_5\ e_6\ e_3\}$

With the assumption (e_0, e_4) is not part of the spatial representation, if we were to do a rotation about z, we would have four simultaneous rotations between our basis elements associated with physical xyz

$e_1 \leftrightarrow e_2$
$e_1 \leftrightarrow e_6$
$e_5 \leftrightarrow e_2$
$e_5 \leftrightarrow e_6$

This would take the four basis elements e_1 e_2 e_5 and e_6 each simultaneously in two different directions. I am going to beg off the question of how to do this or even if it might be physically significant by simply stating that will not be what we will be doing here. Instead we will be rotating about single basis elements. Since we have a Quaternion subalgebra representing the closed set xyz multiplication rules, it would seem sensible to do our Euler Angle rotations within $\{e_1\ e_2\ e_3\}$. Alternatively it would be just as sensible to do our Euler Angle rotations within $\{e_5\ e_6\ e_7\}$. We will do both.

After each Euler rotation, we will have a new basis set that will be a linear combination of the initial $e_0\ e_1\ e_2\ e_3\ e_4\ e_5\ e_6\ e_7$ basis. Call these rotated bases u-primed, where u' is the system of Euler First Rotations, u'' is the system of Euler Second Rotations, and u''' the system of Euler Third Rotations. The zero angle rotation will always leave the basis system unchanged. We will demand that for any single choice within the 16 possible Octonion Algebras, the Euler formalism for that algebra will be such that

If $e_a * e_b = e_c$ and for "/" indicating conjugation, then

$u'_a * u'_b = u'_c$ $\quad$ $u'_a * u'_a = -1$ $\quad$ $u'_a * /u'_a = +1$

$u''_a * u''_b = u''_c$ $\quad$ $u''_a * u''_a = -1$ $\quad$ $u''_a * /u''_a = +1$

$u'''_a * u'''_b = u'''_c$ $\quad$ $u'''_a * u'''_a = -1$ $\quad$ $u'''_a * /u'''_a = +1$

The first demonstration will be Euler rotations within the $\{e_1\ e_2\ e_3\}$ Quaternion subalgebra. First will be a rotation about the e_3 axis by an angle (a). This will be followed by a rotation about the u'_1 axis by an angle (b). The last will be a rotation about the u''_3 axis by an angle (c).

For the first rotation, the relevant triplets are $\{e_1\ e_2\ e_3\}$ and $\{e_5\ e_6\ e_3\}$ implying the rotations $e_1 \leftrightarrow e_2$ and $e_5 \leftrightarrow e_6$ within their planes. Looking over the element order for these two permutations over all 16 Octonion Algebras, all possible combinations of xyz handedness between the two occur. We shall soon see this is an important observation. The process for determining a new u' basis set is outlined in [2]. We are rotating about e_3 so we have

$u'_3 = e_3$

We now assign the linear combinations for two additional u' bases where the three assigned u' elements do not appear in a Quaternion subalgebra. This works out to assigning one from each of our e_3 rotations $e_1 \leftrightarrow e_2$ and $e_5 \leftrightarrow e_6$. I will arbitrarily choose one each from the xyz representation. We will then find all other u' basis elements by multiplications on the assigned u', and one generated u'.

Let

$u'_1 = \cos(a)\ e_1 - s_{12} \sin(a)\ e_2$
$u'_6 = \cos(a)\ e_6 - s_{56} \sin(a)\ e_5$

Here, s_{12} and s_{56} are either +1 or -1 to set the orientation for angle (a) in the (e_1 e_2) and (e_5 e_6) planes. We will now establish their rule.

Form the product $u'_1 * u'_6$. Depending on the Octonion Algebra employed, we would expect the result to be +/- u'_7. We also do not want any {e_7 e_4 e_3} rotation $e_7 \leftrightarrow e_4$.

$u'_1 * u'_6 =$
$+\cos^2(a)\ (e_1 * e_6) + \sin^2(a)\ (e_2 * e_5)\ s_{12}\ s_{56}$
$-\cos(a)\ \sin(a)\ s_{56}\ (e_1 * e_5) - \sin(a)\ \cos(a)\ s_{12}\ (e_2 * e_6)$

We want the first result line to be independent of angle (a) and the second line to be zero for all possible Octonion Algebras. This will be the case if for all algebras:

$\mathrm{Sign}(e_1 * e_6) = \mathrm{Sign}(\ (e_2 * e_5)\ s_{12}\ s_{56}\ )$ and
$\mathrm{Sign}(\ s_{56}\ (e_1 * e_5)\ ) = -\mathrm{Sign}(\ s_{12}\ (e_2 * e_6)\ )$

Try $s_{12} = \mathrm{Sign}(e_1 * e_2)$ and $s_{56} = \mathrm{Sign}(e_5 * e_6)$

Rather than doing all algebra possibilities, we can do one and determine the remainder by examining the effect of applying the mapping between algebras. Start with R0. The first line for $u'_1 * u'_6$ becomes

$s_{12} = +1$, $s_{56} = -1$, $\mathrm{Sign}(e_2 * e_5) = +1$, $\mathrm{Sign}(e_1 * e_6) = -1$, giving $-(\cos^2(a)+\sin^2(a))\ e_7$

Since for R0 $\mathrm{Sign}(e_1 * e_5) = \mathrm{Sign}(e_2 * e_6)$, $s_{12} = +1$, $s_{56} = -1$ makes the second line 0. Therefore we have no e_4 component to our product. Thus $u'_1 * u'_6 = -\ u'_7 = -\ e_7$ as it should for our choices for s_{12} and s_{56} within the R0 algebra .

Now the elemental moves between algebras are negating the permutation rule for all three permutations that include one of the basis elements, or all four permutations that do not include one of the basis units. If you do the math on all algebras, you will find that indeed $u'_1 * u'_6$ will always be either $+e_7$ or $-e_7$ as required.

Summarizing the First Euler Rotation within {e_1 e_2 e_3} about e_3 by angle (a)

Assign:
$u'_3 = e_3$
$u'_1 = \cos(a)\ e_1 - \mathrm{Sign}(e_1 * e_2)\ \sin(a)\ e_2$
$u'_6 = \cos(a)\ e_6 - \mathrm{Sign}(e_5 * e_6)\ \sin(a)\ e_5$

Calculate:
$u'_7 = \mathrm{Sign}(e_1 * e_6)\ u'_1 * u'_6$
$u'_2 = \mathrm{Sign}(e_3 * e_1)\ u'_3 * u'_1$
$u'_5 = \mathrm{Sign}(e_3 * e_6)\ u'_3 * u'_6$
$u'_4 = \mathrm{Sign}(e_3 * e_7)\ u'_3 * u'_7$

The attachment of Sign functions to the calculated basis elements is only to reflect the proper order for the product as defined by the particular algebra applied. This can be done since they will anti-commute.

Running through the rules for all algebras, we find $u'_4 = e_4$ and $u'_7 = e_7$ for every choice. Also the element product rules for the original basis set and the new basis are identical. So it would seem we have a valid algorithm for doing a rotation that meets our requirements.

Next do the Second Euler Rotation within $\{e_1\ e_2\ e_3\}$ about u'_1 by angle (b).

Assign:
$u''_1 = u'_1$
$u''_2 = \cos(b)\ u'_2 - \mathrm{Sign}(e_2 * e_3)\ \sin(b)\ u'_3$
$u''_7 = \cos(b)\ u'_7 - \mathrm{Sign}(e_6 * e_7)\ \sin(b)\ u'_6$

Calculate:
$u''_5 = \mathrm{Sign}(e_2 * e_7)\ u''_2 * u''_7$
$u''_3 = \mathrm{Sign}(e_1 * e_2)\ u''_1 * u''_2$
$u''_6 = \mathrm{Sign}(e_1 * e_7)\ u''_1 * u''_7$
$u''_4 = \mathrm{Sign}(e_1 * e_5)\ u''_1 * u''_5$

Finally do the Third Euler Rotation within $\{e_1\ e_2\ e_3\}$ about u''_3 by angle (c).

Assign:
$u'''_3 = u''_3$
$u'''_1 = \cos(c)\ u''_1 - \mathrm{Sign}(e_1 * e_2)\ \sin(c)\ u''_2$
$u'''_6 = \cos(c)\ u''_6 - \mathrm{Sign}(e_5 * e_6)\ \sin(c)\ u''_5$

Calculate:
$u'''_7 = \mathrm{Sign}(e_1 * e_6)\ u''_1 * u''_6$
$u'''_2 = \mathrm{Sign}(e_3 * e_1)\ u''_3 * u''_1$
$u'''_5 = \mathrm{Sign}(e_3 * e_6)\ u''_3 * u''_6$
$u'''_4 = \mathrm{Sign}(e_3 * e_7)\ u''_3 * u''_7$

If you would closely examine the $\mathrm{Sign}(e_i * e_j)$ prefixing on the sine functions in the assigned rotation forms, you can see that they fix all angle definitions to a common xyz physical orientation, independent of the handedness of the triplet system the rotation is applied in which may change between algebra definitions. This is a requirement to have results which rotate only in the spatial pairings (e_1, e_5) (e_2, e_6) and (e_3, e_7), while leaving unmodified the non-spatial pair (e_0, e_4). This is a nice corroboration of the chosen physical xyz connection to Octonion Algebra.

The following tables summarize the results for First, Second and Third Euler Rotations within $\{e_1\ e_2\ e_3\}$. In these representations [i] implies e_i defined for the given algebra.

First Euler Rotation within $\{e_1\ e_2\ e_3\}$ for angle (a)

Algebra	u0’	u1’	u2’	u3’	u4’	u5’	u6’	u7’
R0	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a) [6]+cos(a)	[7]+1
R1	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a) [6]+cos(a)	[7]+1
R2	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a) [6]+cos(a)	[7]+1
R3	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a) [6]+cos(a)	[7]+1
R4	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a) [6]+cos(a)	[7]+1
R5	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a) [6]+cos(a)	[7]+1
R6	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a) [6]+cos(a)	[7]+1
R7	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a) [6]+cos(a)	[7]+1
L0	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a) [6]+cos(a)	[7]+1
L1	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a) [6]+cos(a)	[7]+1
L2	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a) [6]+cos(a)	[7]+1
L3	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a) [6]+cos(a)	[7]+1
L4	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a) [6]+cos(a)	[7]+1
L5	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a) [6]+cos(a)	[7]+1
L6	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a) [6]+cos(a)	[7]+1
L7	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a) [2]+cos(a)	[3]+1	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a) [6]+cos(a)	[7]+1

Second Euler Rotation within $\{e_1\ e_2\ e_3\}$ for angle (b)

Algebra	u0’’	u1’’	u2’’	u3’’	u4’’	u5’’	u6’’	u7’’
R0	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a)cos(b) [2]+cos(a)cos(b) [3]-sin(b)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a)cos(b) [6]+cos(a)cos(b) [7]-sin(b)	[5]+sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
R1	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a)cos(b) [2]+cos(a)cos(b) [3]-sin(b)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a)cos(b) [6]+cos(a)cos(b) [7]-sin(b)	[5]-sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
R2	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a)cos(b) [2]+cos(a)cos(b) [3]-sin(b)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a)cos(b) [6]+cos(a)cos(b) [7]+sin(b)	[5]+sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
R3	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a)cos(b) [2]+cos(a)cos(b) [3]-sin(b)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a)cos(b) [6]+cos(a)cos(b) [7]+sin(b)	[5]-sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
R4	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a)cos(b) [2]+cos(a)cos(b) [3]+sin(b)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a)cos(b) [6]+cos(a)cos(b) [7]+sin(b)	[5]+sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
R5	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a)cos(b) [2]+cos(a)cos(b) [3]+sin(b)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a)cos(b) [6]+cos(a)cos(b) [7]+sin(b)	[5]-sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
R6	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a)cos(b) [2]+cos(a)cos(b) [3]+sin(b)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a)cos(b) [6]+cos(a)cos(b) [7]-sin(b)	[5]+sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
R7	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a)cos(b) [2]+cos(a)cos(b) [3]+sin(b)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a)cos(b) [6]+cos(a)cos(b) [7]-sin(b)	[5]-sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
L0	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a)cos(b) [2]+cos(a)cos(b) [3]-sin(b)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a)cos(b) [6]+cos(a)cos(b) [7]-sin(b)	[5]+sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
L1	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a)cos(b) [2]+cos(a)cos(b) [3]-sin(b)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a)cos(b) [6]+cos(a)cos(b) [7]-sin(b)	[5]-sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
L2	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a)cos(b) [2]+cos(a)cos(b) [3]-sin(b)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a)cos(b) [6]+cos(a)cos(b) [7]+sin(b)	[5]+sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
L3	[0]+1	[1]+cos(a) [2]-sin(a)	[1]+sin(a)cos(b) [2]+cos(a)cos(b) [3]-sin(b)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a)cos(b) [6]+cos(a)cos(b) [7]+sin(b)	[5]-sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
L4	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a)cos(b) [2]+cos(a)cos(b) [3]+sin(b)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a)cos(b) [6]+cos(a)cos(b) [7]+sin(b)	[5]+sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
L5	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a)cos(b) [2]+cos(a)cos(b) [3]+sin(b)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a)cos(b) [6]+cos(a)cos(b) [7]+sin(b)	[5]-sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
L6	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a)cos(b) [2]+cos(a)cos(b) [3]+sin(b)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]-sin(a)	[5]+sin(a)cos(b) [6]+cos(a)cos(b) [7]-sin(b)	[5]+sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
L7	[0]+1	[1]+cos(a) [2]+sin(a)	[1]-sin(a)cos(b) [2]+cos(a)cos(b) [3]+sin(b)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)	[4]+1	[5]+cos(a) [6]+sin(a)	[5]-sin(a)cos(b) [6]+cos(a)cos(b) [7]-sin(b)	[5]-sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)

Third Euler Rotation within {e_1 e_2 e_3} for angle (c)

Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R0	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]+cos(a)sin(c)+sin(a)cos(b)cos(c) [2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [3]-sin(b)cos(c)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c) [7]+sin(b)sin(c)	[5]+sin(a)cos(b)cos(c)+cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]-sin(b)cos(c)	[5]+sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R1	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]+cos(a)sin(c)+sin(a)cos(b)cos(c) [2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [3]-sin(b)cos(c)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c) [7]-sin(b)sin(c)	[5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]-sin(b)cos(c)	[5]-sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R2	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]+cos(a)sin(c)+sin(a)cos(b)cos(c) [2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [3]-sin(b)cos(c)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c) [7]+sin(b)sin(c)	[5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]+sin(b)cos(c)	[5]+sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R3	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]+cos(a)sin(c)+sin(a)cos(b)cos(c) [2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [3]-sin(b)cos(c)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c) [7]-sin(b)sin(c)	[5]+sin(a)cos(b)cos(c)+cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]+sin(b)cos(c)	[5]-sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R4	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [3]+sin(b)cos(c)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c) [7]+sin(b)sin(c)	[5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]+sin(b)cos(c)	[5]+sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R5	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [3]+sin(b)cos(c)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c) [7]-sin(b)sin(c)	[5]+sin(a)cos(b)cos(c)+cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]+sin(b)cos(c)	[5]-sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R6	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [3]+sin(b)cos(c)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c) [7]+sin(b)sin(c)	[5]+sin(a)cos(b)cos(c)+cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]-sin(b)cos(c)	[5]+sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R7	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [3]+sin(b)cos(c)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c) [7]-sin(b)sin(c)	[5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]-sin(b)cos(c)	[5]-sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)

Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L0	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]+cos(a)sin(c)+sin(a)cos(b)cos(c) [2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [3]-sin(b)cos(c)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c) [7]+sin(b)sin(c)	[5]+sin(a)cos(b)cos(c)+cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]-sin(b)cos(c)	[5]+sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L1	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]+cos(a)sin(c)+sin(a)cos(b)cos(c) [2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [3]-sin(b)cos(c)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c) [7]-sin(b)sin(c)	[5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]-sin(b)cos(c)	[5]-sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L2	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]+cos(a)sin(c)+sin(a)cos(b)cos(c) [2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [3]-sin(b)cos(c)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c) [7]+sin(b)sin(c)	[5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]+sin(b)cos(c)	[5]+sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L3	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]+cos(a)sin(c)+sin(a)cos(b)cos(c) [2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [3]-sin(b)cos(c)	[1]+sin(a)sin(b) [2]+cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c) [7]-sin(b)sin(c)	[5]+sin(a)cos(b)cos(c)+cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]+sin(b)cos(c)	[5]-sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L4	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [3]+sin(b)cos(c)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c) [7]+sin(b)sin(c)	[5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]+sin(b)cos(c)	[5]+sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L5	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [3]+sin(b)cos(c)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c) [7]-sin(b)sin(c)	[5]+sin(a)cos(b)cos(c)+cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]+sin(b)cos(c)	[5]-sin(a)sin(b) [6]-cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L6	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [3]+sin(b)cos(c)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c) [7]+sin(b)sin(c)	[5]+sin(a)cos(b)cos(c)+cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]-sin(b)cos(c)	[5]+sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L7	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [3]+sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [3]+sin(b)cos(c)	[1]+sin(a)sin(b) [2]-cos(a)sin(b) [3]+cos(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c) [7]-sin(b)sin(c)	[5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c) [7]-sin(b)cos(c)	[5]-sin(a)sin(b) [6]+cos(a)sin(b) [7]+cos(b)

Now we will do the same, but within $\{e_5\ e_6\ e_7\}$.

The First Euler Rotation within $\{e_5\ e_6\ e_7\}$ is about e_7 by an angle (a).

Assign:
$u'_7 = e_7$
$u'_5 = \cos(a)\ e_5 - \text{Sign}(e_5 * e_2) \sin(a)\ e_2$
$u'_6 = \cos(a)\ e_6 - \text{Sign}(e_1 * e_6) \sin(a)\ e_1$

Calculate:
$u'_3 = \text{Sign}(e_5 * e_6)\ u'_5 * u'_6$
$u'_2 = \text{Sign}(e_7 * e_5)\ u'_7 * u'_5$
$u'_1 = \text{Sign}(e_7 * e_6)\ u'_7 * u'_6$
$u'_4 = \text{Sign}(e_7 * e_3)\ u'_7 * u'_3$

Next do the Second Euler Rotation within $\{e_5\ e_6\ e_7\}$ about u'_5 by angle (b).

Assign:
$u''_5 = u'_5$
$u''_6 = \cos(b)\ u'_6 - \text{Sign}(e_6 * e_3) \sin(b)\ u'_3$
$u''_7 = \cos(b)\ u'_7 - \text{Sign}(e_2 * e_7) \sin(b)\ u'_2$

Calculate:
$u''_1 = \text{Sign}(e_6 * e_7)\ u''_6 * u''_7$
$u''_3 = \text{Sign}(e_5 * e_6)\ u''_5 * u''_6$
$u''_2 = \text{Sign}(e_5 * e_7)\ u''_5 * u''_7$
$u''_4 = \text{Sign}(e_5 * e_1)\ u''_5 * u''_1$

Finally, do the Third Euler Rotation within $\{e_5\ e_6\ e_7\}$ about u''_7 by angle (c).

Assign:
$u'''_7 = u''_7$
$u'''_5 = \cos(c)\ u''_5 - \text{Sign}(e_5 * e_2) \sin(c)\ u''_2$
$u'''_6 = \cos(c)\ u''_6 - \text{Sign}(e_1 * e_6) \sin(c)\ u''_1$

Calculate:
$u'''_3 = \text{Sign}(e_5 * e_6)\ u''_5 * u''_6$
$u'''_2 = \text{Sign}(e_7 * e_5)\ u''_7 * u''_5$
$u'''_1 = \text{Sign}(e_7 * e_6)\ u''_7 * u''_6$
$u'''_4 = \text{Sign}(e_7 * e_3)\ u''_7 * u''_3$

First Euler Rotation within {e_5 e_6 e_7} for angle (a)

Algebra	u0’	u1’	u2’	u3’	u4’	u5’	u6’	u7’
R0	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a) [5]-sin(a)	[3]+1	[4]+1	[2]+sin(a) [5]+cos(a)	[1]+sin(a) [6]+cos(a)	[7]+1
R1	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a) [5]+sin(a)	[3]+1	[4]+1	[2]-sin(a) [5]+cos(a)	[1]+sin(a) [6]+cos(a)	[7]+1
R2	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a) [5]-sin(a)	[3]+1	[4]+1	[2]+sin(a) [5]+cos(a)	[1]-sin(a) [6]+cos(a)	[7]+1
R3	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a) [5]+sin(a)	[3]+1	[4]+1	[2]-sin(a) [5]+cos(a)	[1]-sin(a) [6]+cos(a)	[7]+1
R4	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a) [5]+sin(a)	[3]+1	[4]+1	[2]-sin(a) [5]+cos(a)	[1]-sin(a) [6]+cos(a)	[7]+1
R5	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a) [5]-sin(a)	[3]+1	[4]+1	[2]+sin(a) [5]+cos(a)	[1]-sin(a) [6]+cos(a)	[7]+1
R6	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a) [5]+sin(a)	[3]+1	[4]+1	[2]-sin(a) [5]+cos(a)	[1]+sin(a) [6]+cos(a)	[7]+1
R7	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a) [5]-sin(a)	[3]+1	[4]+1	[2]+sin(a) [5]+cos(a)	[1]+sin(a) [6]+cos(a)	[7]+1
L0	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a) [5]-sin(a)	[3]+1	[4]+1	[2]+sin(a) [5]+cos(a)	[1]+sin(a) [6]+cos(a)	[7]+1
L1	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a) [5]+sin(a)	[3]+1	[4]+1	[2]-sin(a) [5]+cos(a)	[1]+sin(a) [6]+cos(a)	[7]+1
L2	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a) [5]-sin(a)	[3]+1	[4]+1	[2]+sin(a) [5]+cos(a)	[1]-sin(a) [6]+cos(a)	[7]+1
L3	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a) [5]+sin(a)	[3]+1	[4]+1	[2]-sin(a) [5]+cos(a)	[1]-sin(a) [6]+cos(a)	[7]+1
L4	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a) [5]+sin(a)	[3]+1	[4]+1	[2]-sin(a) [5]+cos(a)	[1]-sin(a) [6]+cos(a)	[7]+1
L5	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a) [5]-sin(a)	[3]+1	[4]+1	[2]+sin(a) [5]+cos(a)	[1]-sin(a) [6]+cos(a)	[7]+1
L6	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a) [5]+sin(a)	[3]+1	[4]+1	[2]-sin(a) [5]+cos(a)	[1]+sin(a) [6]+cos(a)	[7]+1
L7	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a) [5]-sin(a)	[3]+1	[4]+1	[2]+sin(a) [5]+cos(a)	[1]+sin(a) [6]+cos(a)	[7]+1

Second Euler Rotation within {e_5 e_6 e_7} for angle (b)

Algebra	u0’’	u1’’	u2’’	u3’’	u4’’	u5’’	u6’’	u7’’
R0	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a)cos(b) [5]-sin(a)cos(b) [7]-sin(b)	[1]-sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)	[4]+1	[2]+sin(a) [5]+cos(a)	[1]+sin(a)cos(b) [3]+sin(b) [6]+cos(a)cos(b)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
R1	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a)cos(b) [5]+sin(a)cos(b) [7]+sin(b)	[1]+sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)	[4]+1	[2]-sin(a) [5]+cos(a)	[1]+sin(a)cos(b) [3]-sin(b) [6]+cos(a)cos(b)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
R2	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a)cos(b) [5]-sin(a)cos(b) [7]-sin(b)	[1]-sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)	[4]+1	[2]+sin(a) [5]+cos(a)	[1]-sin(a)cos(b) [3]-sin(b) [6]+cos(a)cos(b)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
R3	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a)cos(b) [5]+sin(a)cos(b) [7]+sin(b)	[1]+sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)	[4]+1	[2]-sin(a) [5]+cos(a)	[1]-sin(a)cos(b) [3]+sin(b) [6]+cos(a)cos(b)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
R4	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a)cos(b) [5]+sin(a)cos(b) [7]+sin(b)	[1]-sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)	[4]+1	[2]-sin(a) [5]+cos(a)	[1]-sin(a)cos(b) [3]-sin(b) [6]+cos(a)cos(b)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
R5	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a)cos(b) [5]-sin(a)cos(b) [7]-sin(b)	[1]+sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)	[4]+1	[2]+sin(a) [5]+cos(a)	[1]-sin(a)cos(b) [3]+sin(b) [6]+cos(a)cos(b)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
R6	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a)cos(b) [5]+sin(a)cos(b) [7]+sin(b)	[1]-sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)	[4]+1	[2]-sin(a) [5]+cos(a)	[1]+sin(a)cos(b) [3]+sin(b) [6]+cos(a)cos(b)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
R7	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a)cos(b) [5]-sin(a)cos(b) [7]-sin(b)	[1]+sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)	[4]+1	[2]+sin(a) [5]+cos(a)	[1]+sin(a)cos(b) [3]-sin(b) [6]+cos(a)cos(b)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
L0	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a)cos(b) [5]-sin(a)cos(b) [7]-sin(b)	[1]-sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)	[4]+1	[2]+sin(a) [5]+cos(a)	[1]+sin(a)cos(b) [3]+sin(b) [6]+cos(a)cos(b)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
L1	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a)cos(b) [5]+sin(a)cos(b) [7]+sin(b)	[1]+sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)	[4]+1	[2]-sin(a) [5]+cos(a)	[1]+sin(a)cos(b) [3]-sin(b) [6]+cos(a)cos(b)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
L2	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a)cos(b) [5]-sin(a)cos(b) [7]-sin(b)	[1]-sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)	[4]+1	[2]+sin(a) [5]+cos(a)	[1]-sin(a)cos(b) [3]-sin(b) [6]+cos(a)cos(b)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
L3	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a)cos(b) [5]+sin(a)cos(b) [7]+sin(b)	[1]+sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)	[4]+1	[2]-sin(a) [5]+cos(a)	[1]-sin(a)cos(b) [3]+sin(b) [6]+cos(a)cos(b)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
L4	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a)cos(b) [5]+sin(a)cos(b) [7]+sin(b)	[1]-sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)	[4]+1	[2]-sin(a) [5]+cos(a)	[1]-sin(a)cos(b) [3]-sin(b) [6]+cos(a)cos(b)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
L5	[0]+1	[1]+cos(a) [6]+sin(a)	[2]+cos(a)cos(b) [5]-sin(a)cos(b) [7]-sin(b)	[1]+sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)	[4]+1	[2]+sin(a) [5]+cos(a)	[1]-sin(a)cos(b) [3]+sin(b) [6]+cos(a)cos(b)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
L6	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a)cos(b) [5]+sin(a)cos(b) [7]+sin(b)	[1]-sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)	[4]+1	[2]-sin(a) [5]+cos(a)	[1]+sin(a)cos(b) [3]+sin(b) [6]+cos(a)cos(b)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
L7	[0]+1	[1]+cos(a) [6]-sin(a)	[2]+cos(a)cos(b) [5]-sin(a)cos(b) [7]-sin(b)	[1]+sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)	[4]+1	[2]+sin(a) [5]+cos(a)	[1]+sin(a)cos(b) [3]-sin(b) [6]+cos(a)cos(b)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)

Third Euler Rotation within $\{e_5\ e_6\ e_7\}$ for angle (c)

Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R0	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]-sin(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c)	[2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [7]-sin(b)cos(c)	[1]-sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]+sin(a)cos(b)cos(c)+cos(a)sin(c) [3]+sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R1	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]+sin(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c)	[2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [5]+cos(a)sin(c)+sin(a)cos(b)cos(c) [7]+sin(b)cos(c)	[1]+sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]+sin(a)cos(b)cos(c)+cos(a)sin(c) [3]-sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R2	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]-sin(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c)	[2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [7]-sin(b)cos(c)	[1]-sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [3]-sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R3	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]+sin(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c)	[2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [5]+cos(a)sin(c)+sin(a)cos(b)cos(c) [7]+sin(b)cos(c)	[1]+sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [3]+sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R4	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]-sin(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c)	[2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [5]+cos(a)sin(c)+sin(a)cos(b)cos(c) [7]+sin(b)cos(c)	[1]-sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [3]-sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R5	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]+sin(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c)	[2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [7]-sin(b)cos(c)	[1]+sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [3]+sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R6	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]-sin(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c)	[2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [5]+cos(a)sin(c)+sin(a)cos(b)cos(c) [7]+sin(b)cos(c)	[1]-sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]+sin(a)cos(b)cos(c)+cos(a)sin(c) [3]+sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
R7	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]+sin(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c)	[2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [7]-sin(b)cos(c)	[1]+sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]+sin(a)cos(b)cos(c)+cos(a)sin(c) [3]-sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)

Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L0	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]-sin(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c)	[2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [7]-sin(b)cos(c)	[1]-sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]+sin(a)cos(b)cos(c)+cos(a)sin(c) [3]+sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L1	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]+sin(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c)	[2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [5]+cos(a)sin(c)+sin(a)cos(b)cos(c) [7]+sin(b)cos(c)	[1]+sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]+sin(a)cos(b)cos(c)+cos(a)sin(c) [3]-sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L2	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]-sin(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c)	[2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [7]-sin(b)cos(c)	[1]-sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [3]-sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L3	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]+sin(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c)	[2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [5]+cos(a)sin(c)+sin(a)cos(b)cos(c) [7]+sin(b)cos(c)	[1]+sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [3]+sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L4	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]-sin(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c)	[2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [5]+cos(a)sin(c)+sin(a)cos(b)cos(c) [7]+sin(b)cos(c)	[1]-sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [3]-sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L5	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]+sin(b)sin(c) [6]+sin(a)cos(c)+cos(a)cos(b)sin(c)	[2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [7]-sin(b)cos(c)	[1]+sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]-sin(a)cos(b)cos(c)-cos(a)sin(c) [3]+sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L6	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]-sin(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c)	[2]-sin(a)sin(c)+cos(a)cos(b)cos(c) [5]+cos(a)sin(c)+sin(a)cos(b)cos(c) [7]+sin(b)cos(c)	[1]-sin(a)sin(b) [3]+cos(b) [6]-cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]-sin(a)cos(c)-cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]+sin(a)cos(b)cos(c)+cos(a)sin(c) [3]+sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]-cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)
Algebra	u0’’’	u1’’’	u2’’’	u3’’’
L7	[0]+1	[1]+cos(a)cos(c)-sin(a)cos(b)sin(c) [3]+sin(b)sin(c) [6]-sin(a)cos(c)-cos(a)cos(b)sin(c)	[2]+cos(a)cos(b)cos(c)-sin(a)sin(c) [5]-sin(a)cos(b)cos(c)-cos(a)sin(c) [7]-sin(b)cos(c)	[1]+sin(a)sin(b) [3]+cos(b) [6]+cos(a)sin(b)
	u4’’’	u5’’’	u6’’’	u7’’’
	[4]+1	[2]+sin(a)cos(c)+cos(a)cos(b)sin(c) [5]+cos(a)cos(c)-sin(a)cos(b)sin(c) [7]-sin(b)sin(c)	[1]+sin(a)cos(b)cos(c)+cos(a)sin(c) [3]-sin(b)cos(c) [6]+cos(a)cos(b)cos(c)-sin(a)sin(c)	[2]+cos(a)sin(b) [5]-sin(a)sin(b) [7]+cos(b)

In conclusion, the above method for generating Euler Angle rotations within the framework of the full set of Octonion Algebra definitions validates the representation of physical 3D xyz space as a double cover by six of the seven Octonion basis elements. It further validates the application of Octonion Algebra to Electrodynamics as I have shown here [1] and have been actively promoting for nearly a decade now. It will set the framework from which the same methodology I used to demonstrate general Octonion Conservation of Momentum can be applied to demonstrate Octonion Conservation of Angular Momentum.

References

[1] R. Lockyer, "Octonion Algebra and its Connection to Physics"
http://www.octospace.com/files/Octonion_Algebra_and_its_Connection_to_Physics.pdf
2008

[2] M. Zorn, "The automorphisms of Cayley's non-associative algebra," *Proceedings of the National Academy of Sciences of the United States of America*, vol. 21, no. 6, pp. 355–358, 1935.