Refutation of a Gerhard W. Bruhn paper

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The following is a refutation of the paper: Bruhn, G. W. (2006), *No Lorentz property of M W Evans' O(3)-symmetry law*, Physica Scripta, 74(5), 537–538.

Detailed Points of Refutation

The correct way to transform the B Cyclic Theorem is well known and described in great detail in the literature [*].

Bruhn refers to an Eq. (1.1) which does not appear in the text until halfway down Page 2.

The real part of $B^{(1)}$ is

$$\mathrm{Re}\left(\frac{B^{(0)}}{\sqrt{2}}(i-ij)(\cos\phi+i\,\sin\,\phi)\right)$$
$$=(\frac{B^{(0)}}{\sqrt{2}}(i\cos\phi+j\sin\phi)\ , \qquad (1)$$

which is trivially apparent.

The Bruhn equation (1.5) is also trivial:

$$\frac{1}{2}\left(B_x^2+B_y^2\right)=B_z^2\ . \qquad (2)$$

After Lorentz transformation (assuming that Bruhn did the math correctly), it becomes:

$$\frac{1}{2}\left(B_x'^2+B_y'^2\right)=\frac{1-\beta}{1+\beta}\frac{1}{2}\left(B_x^2+B_y^2\right)=\frac{1-\beta}{1+\beta}B_z^2=\frac{1-\beta}{1+\beta}B_z'^2\ . \qquad (3)$$

Equations (2) and (3) demonstrate Lorentz covariance of the B Cyclic Theorem. This is because Eq. (3) is of the same form as Eq. (2).

The factor β is

$$\beta=\frac{v}{c}\ . \qquad (4)$$

However, the B Cyclic Theorem applies to a wave travelling at c. Consequently, in Eq. 4,

$$v=0\ . \qquad (5)$$

Therefore, Eq. (3) is the same as Eq. (2). Q.E.D.

Note that the argument is that an electromagnetic plane wave travelling at c, ($B^{(1)} = B^{(2)*}$), cannot travel faster than c.

A reasonable conclusion would be that either Bruhn does not know this rule or he has deliberately contrived an "error".

[*] For additional information, please see (aias.us):

- UFT Paper 89, Appendix 2: *Proof of the Lorentz Invariance of the B Cyclic Theorem*. (Notice the explanation in the last paragraph about how the factor $B^{(0)}$ cancels out. This critical factor is equal to $\kappa A^{(0)}$ (see Paper 89, Appendix 3), which contains the Lorentz-variant wave number κ.)

- UFT Paper 89, Appendix 10: *Rebuttal of G. Bruhn's Comments on the Lorentz Covariance of the B Cyclic Theorem*.

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