394(5): Note on Conservation of Vector Antisymmetry

In MZ theory, the magnetic flux density is calculated from:

$$\langle B \rangle_{ij} = \left( \underline{\nabla} \times \underline{A} - \langle \underline{\omega} \rangle \times \underline{A} \right)_{ij} \quad -(1)$$

$$= - \langle B \rangle_{ji}$$

So:

$$(\partial_1 + \omega_1) A_2 = -(\partial_2 + \omega_2) A_1 \quad -(2)$$

$$(\partial_2 + \omega_2) A_3 = -(\partial_3 + \omega_3) A_2 \quad -(3)$$

$$(\partial_1 + \omega_1) A_3 = -(\partial_3 + \omega_3) A_1 \quad -(4)$$

Write eq. (2) as:

$$\partial_1 A_2 + \omega_1 A_2 + \partial_2 A_1 + \omega_2 A_1 = 0 \quad -(5)$$

Translating from covariant to Cartesian:

$$-\frac{\partial A_Y}{\partial X} + \omega_X A_Y - \frac{\partial A_X}{\partial Y} + \omega_Y A_X = 0 \quad -(6)$$

i.e.

$$\frac{\partial A_X}{\partial Y} + \frac{\partial A_Y}{\partial X} = \omega_X A_Y + \omega_Y A_X \quad -(7)$$

et cyclicum

Q.E.D.

Eq. (7) is the vector antisymmetry law used in previous work. It is equivalent to:

$$\langle B \rangle_{XY} = - \langle B \rangle_{YX} \quad -(8)$$

in Cartesian, and in covariant:

$$\langle B \rangle_{ij} = - \langle B \rangle_{ji} \quad -(9)$$

In MZ theory, $\langle \underline{B} \rangle$ and $\underline{A}$ are known and $\langle \underline{\omega} \rangle$ is calculated from them using eq. (1), where antisymmetry is obeyed automatically.