1) 115(7): The Hodge Dual of the Interaction Current

The interaction current is:

$$\tilde{J}_{int} = \left(\tilde{R} \wedge q - \omega \wedge \tilde{T}\right)_{int} \quad -(1)$$

While Hodge dual is:

$$J_{int} = \left(R \wedge q - \omega \wedge T\right)_{int} \quad -(2)$$

Therefore the Hodge dual of:

$$\underline{\nabla} \cdot \underline{D} = \rho \quad -(3)$$

$$\underline{\nabla} \times \underline{H} + \frac{\partial \underline{D}}{\partial t} = \underline{J} \quad -(4)$$

is:

$$\underline{\nabla} \cdot \underline{H} = -\underline{\nabla} \cdot \underline{M} := \tilde{\rho} \quad -(5)$$

$$\underline{\nabla} \times \underline{D} + \frac{1}{c^2}\frac{\partial \underline{H}}{\partial t} = \underline{\nabla} \times \underline{P} - \frac{1}{c^2}\frac{\partial \underline{M}}{\partial t} := \underline{\tilde{J}} \quad -(6)$$

where:

$$\underline{E} = \frac{1}{\epsilon_0}\left(\underline{D} - \underline{P}\right), \quad \underline{B} = \mu_0\left(\underline{H} + \underline{M}\right) \quad -(7)$$