SIMPLE EQUATIONS FOR ENERGY FROM SPACETIME

by

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ABSTRACT

Simple field and wave equations of fluid electrodynamics are developed in order to describe the transfer of energy and power from a fluid aether or spacetime to a circuit. It is shown that the process conserves total energy / momentum and total charge / current density, which are transferred form the aether to the circuit.

Keywords: ECE2, fluid electrodynamics, field and wave equations of energy from spacetime.

4FT 355

1 INTRODUCTION.

In recent papers of this series {1 - 12} the subject of fluid electrodynamics has been developed on the basis of ECE2 unified field theory. This new subject merges two vast areas of physics: fluid dynamics and electrodynamics and gives many new insights to the subject of energy from spacetime (ES). In Section 2, simple field and wave equations of ES are developed, and can be applied in many ways. The spacetime or aether surrounding a circuit is considered to be a fluid described by the equations of fluid dynamics developed in recent papers (UFT349, and 351-353). The velocity field of the aether is calculated and from this, the electric field strength E and magnetic flux density B produced in the circuit by ubiquitous spacetime (the fluid aether) can calculated from ECE fluid dynamics. The scalar and vector potentials of the circuit can be calculated similarly. Conversely, E and B in the circuit sets up patterns of fluid flow in the aether. In Section 3 these motions are computed and animated.

This paper is a brief synopsis of the background notes posted on www.aias.us with UFT355. Note 355(1) is a description of the Poynting Theorem and conventional conservation of energy electrodynamics. Note 355(2) is a description of conservation of energy in the wave equation of ECE2 fluid dynamics and fluid electrodynamics. Note 355(3) is a description of hydrodynamics and fluid dynamics from the ECE wave equation, and calculates the scalar curvature R of that equation. Note 355(4) introduces the new field and wave equation used in Section 2. Note 355(5) is a simplification the Navier Stokes equation with the Lorenz condition of ECE2 fluid dynamics.

2. NEW FIELD AND WAVE EQUATIONS OF FLUID ELECTRODYNAMICS

The electric field (E_F) of ECE2 fluid dynamics is defined by the Kambe field equation {1 - 12}:

$$\underline{\nabla} \cdot \underline{E}_F(\text{circuit}) = q_F(\text{spacetime}) \quad -(1)$$

where the Kambe charge is defined by:

$$q_F(\text{spacetime}) = \underline{\nabla} \cdot \left((\underline{v} \cdot \underline{\nabla}) \underline{v} \right) \quad -(2)$$

so:

$$\underline{E}_F(\text{circuit}) = (\underline{v} \cdot \underline{\nabla}) \underline{v}. \quad -(3)$$

The electric field strength in volts per metre induced in the circuit is:

$$\underline{E}(\text{circuit}) = \left(\frac{\rho_m}{\rho} \right)(\text{circuit}) \, \underline{E}_F(\text{circuit}) \quad -(4)$$

where ρ_m / ρ is the ratio of mass density to charge density in the circuit, and $\underline{v}$ is the velocity field of the aether, i.e. of fluid spacetime. So $\underline{E}$ in the circuit is calculated directly from $\underline{v}$ of the aether. The latter is computed by numerically solving the vorticity equation (1 - 12} of fluid spacetime:

$$\frac{D\underline{v}}{Dt} = \frac{\partial \underline{v}}{\partial t} + (\underline{v} \cdot \underline{\nabla}) \underline{v} = \frac{1}{2} \underline{\nabla} v^2 - \frac{1}{R} \left(\underline{\nabla} (\underline{\nabla} \cdot \underline{v}) + \nabla^2 \underline{v} \right) \quad -(5)$$

where R is the Reynolds number. The differential equation (5) must be solved with boundary conditions determined by the design of the circuit.

Having found $\underline{v}$ from Eq. (5) the Kambe current of the fluid spacetime is found from:

$$\underline{J}_F = a_0^2 \underline{\nabla} \times (\underline{\nabla} \times \underline{v}) - \frac{\partial}{\partial t} \left((\underline{v} \cdot \underline{\nabla}) \underline{v} \right) \quad -(6)$$

where a_0 is the assumed constant speed of sound. The Kambe magnetic field is the vorticity of the fluid spacetime. Therefore the Kambe magnetic field in the circuit is:

$$\underline{B}_F = \underline{w} = \underline{\nabla} \times \underline{v}. \quad -(7)$$

The magnetic field strength in tesla induced in the circuit by the fluid spacetime is:

$$\underline{B}\,(\text{circuit}) = \frac{\rho_m}{\rho}\,(\text{circuit})\,\underline{\nabla} \times \underline{v} \quad -(8)$$

where $\underline{v}$ is given by Eq. (5).

Eqs. (6) and (8) are simple equations for $\underline{E}$ and $\underline{B}$ induced in the circuit by the surrounding spacetime. These are observed experimentally in the Ide circuit as described in UFT311. Conversely $\underline{E}$ and $\underline{B}$ of the circuit induce patterns of flow in the surrounding aether. The great advantage of this method is its simplicity, and the fact that knowledge is required only of ρ_m / ρ of the circuit. This ratio is known experimentally.

The electric field strength in volts per metre induced in the circuit can be expressed as:

$$\underline{E}\,(\text{circuit}) = \left(\frac{\rho_m}{\rho}\right)(\text{circuit})\left((\underline{v} \cdot \underline{\nabla})\underline{v}\right)(\text{spacetime})$$

$$= \left(\frac{\rho_m}{\rho}\right)(\text{circuit})\left(-\underline{\nabla}\Phi - \frac{\partial \underline{v}}{\partial t}\right)(\text{spacetime}) \quad -(9)$$

where Φ is the potential of ECE2 fluid dynamics defined in UFT353 from the most general Navier Stokes equation. The spacetime Lorenz condition of UFT353 is:

$$\frac{1}{a_0^2}\frac{\partial \Phi}{\partial t} + \underline{\nabla} \cdot \underline{v} = 0 \quad -(10)$$

so the potential is defined by:

$$\Phi = -a_0^2 \int \underline{\nabla} \cdot \underline{v}\, dt. \quad -(11)$$

As in Note 355(5) it can be used to define a simplified Navier Stokes equation:

$$\frac{D\mathbf{v}}{Dt} = \frac{\partial \mathbf{v}}{\partial t} + (\mathbf{v}\cdot\nabla)\mathbf{v} = a_0^2 \nabla \left(\int \nabla\cdot\mathbf{v}\, dt \right) \quad -(12)$$

from which $\mathbf{v}$ may be computed. Eq (12) may be easier to solve than the simplified vorticity equation:

$$\frac{\partial \mathbf{v}}{\partial t} = \mathbf{v}\times(\nabla\times\mathbf{v}) - \frac{1}{R}\nabla\times(\nabla\times\mathbf{v}) \quad -(13)$$

of ECE2 fluid electrodynamics developed in recent UFT papers.

As in Note 355(2) the Lorenz condition (10) corresponds to the wave equation of fluid electrodynamics:

$$\square W^\mu(\text{circuit}) = \mu_0 J^\mu(\text{spacetime}) \quad -(14)$$

where:

$$W^\mu(\text{circuit}) = \left(\frac{\phi_W}{c}, \mathbf{W} \right)(\text{circuit}). \quad -(15)$$

Here ϕ_W is the scalar potential of ECE2 electrodynamics and $\mathbf{W}$ is its vector potential. The four current of fluid spacetime is defined by:

$$J_F^\mu(\text{spacetime}) = \left(a_0 q_F, \mathbf{J}_F \right). \quad -(16)$$

Defining:

$$V^\mu = \left(\frac{\Phi_0}{a_0}, \mathbf{v} \right) \quad -(17)$$

it follows that the wave equation of ECE2 fluid dynamics developed in previous work is:

$$\square V^\mu(\text{circuit}) = \frac{1}{a_0^2} J_F^\mu(\text{spacetime}). \quad -(18)$$

This equation is equivalent to:

$$\Box \underline{\Phi}(\text{circuit}) = a_0 V_F(\text{spacetime}), \quad -(19)$$

$$\Box \underline{V}(\text{circuit}) = \frac{1}{a_0^2} \underline{J}_F(\text{spacetime}) \quad -(20)$$

and to:

$$\Box W^\mu(\text{circuit}) = \frac{1}{c^2}\left(\frac{\rho_m}{\rho}\right)(\text{circuit})\, J_F^\mu(\text{spacetime}) \quad -(21)$$

It follows that the wave equation defining transfer of energy / momentum from spacetime is:

$$\Box W^\mu(\text{circuit}) = \left(\frac{a_0}{c}\right)^2 \left(\frac{\rho_m}{\rho}\right)(\text{circuit})\, \Box V^\mu(\text{circuit}) \quad -(22)$$

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