Solomon I. Khmelnik

Inconsistency Solution of Maxwell's Equations

Prospect

Annotation

A new solution of Maxwell equations for a vacuum, for wire with constant and alternating current, for the capacitor, for the sphere, etc. is presented. First it must be noted that the proof of the solution's uniqueness is based on the Law of energy conservation which is not observed (for instantaneous values) in the known solution.
The solution offered:

- Describes wave in vacuum and wave in wire;
- Complies with the energy conservation law in each moment of time, i.e. sets constant density of electromagnetic energy flux;
- Reveals phase shifting between electrical and magnetic intensities;
- Explains existence of energy flux along the wire that is equal to the power consumed.

The work offers some technical applications of the solution obtained. A detailed proof is given for interested readers.

Contents

Preface \ 5
Chapter 1. The Second Solution of Maxwell's Equations for vacuum \ 12
Chapter 2. Solution of Maxwell's Equations for Electromagnetic Wave in the Dielectric Circuit of Alternating Current \ 29
Chapter 3. Solution of Maxwell's Equations for Electromagnetic Wave in the Magnetic Circuit of Alternating Current \ 39
Chapter 4. The solution of Maxwell's equations for the low-resistance Wire with Alternating Current \ 47
Chapter 5. Solution of Maxwell's Equations for Wire with Constant \ 66
Chapter 6. Single Wire Energy Emission and Transmission \ 88
Chapter 7. The solution of Maxwell's equations for the capacitor in the constant circuit. The nature of the potential energy of the capacitor. \ 95
Chapter 8. Solution of Maxwell's Equations for Spherical Capacitor \ 104
Chapter 9. The Nature of Earth's Magnetism \ 126
Chapter 10. Solution of Maxwell's Equations for Ball Lightning \ 130
General conclusions \ 143
References \ 147

General conclusions

"To date, whatsoever effect that would request a modification of Maxwell's equations escaped detection" [36]. Nevertheless, recently criticism of validity of Maxwell equations is heard from all sides. This criticism is based mainly on the fact that the known solution of Maxwell's equations describing the electromagnetic wave, has the following two properties:

• it does not satisfy the law of conservation of energy, because the electromagnetic energy flux density pulsating harmonically,

• it prove phase synchronism of electrical and magnetic components of intensities in an electromagnetic wave ; but this is contrary to the idea of constant transformation of electrical and magnetic components of energy in an electromagnetic wave.

These properties of known solutions are clearly visible in Fig. 1.

Such results following from the known solution of Maxwell equations allow doubting the authenticity of Maxwell equations. However, we must stress that these results follow **only from the found solution**. But this solution, as has been stated above, can be different (in their partial derivatives, equations generally have several solutions). Above shows **another solution** of Maxwell's equations. Electric and

magnetic intensities in Cartesian coordinates, obtained as a result of this decision, are shown in Fig. 2.

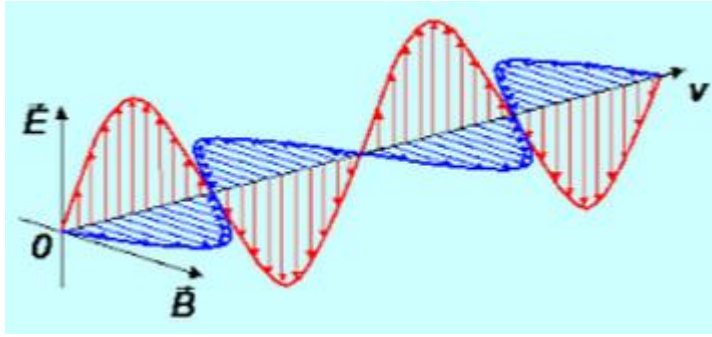

Fig. 1.

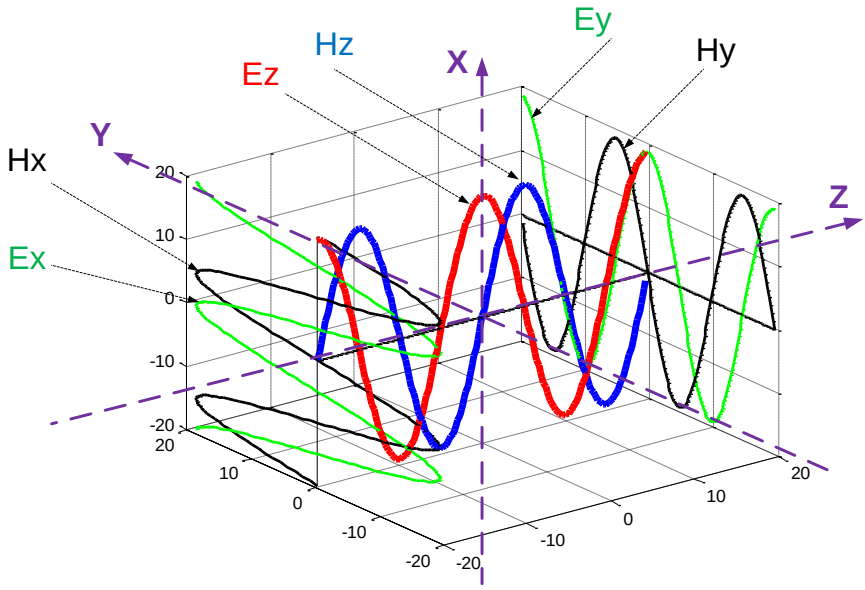

Fig. 2.

The resulting solution describes a wave. The main distinctions from the known solution are as follows:

1. Instantaneous (and not average by certain period) energy flow does **not change** with time, which complies with the **Law of energy conservation**.
2. Magnetic and electrical intensities on one of the coordinate axes **phase-shifted by a quarter of period**.

3. The vectors of electrical and magnetic intensities are **orthogonal**.
4. The flow of electromagnetic energy **propagates along** a wave (not only in vacuum but also in the wire).

In addition, consider an electromagnetic wave in wire. With an assumed negligibly low voltage, Maxwell's equations for this wave literally coincide with those for the wave in vacuum. Yet, electrical engineering eludes any known solution and employs the one that connects an intensity of the circular magnetic field with the current in the wire (for brevity, it will be referred to as "electrical engineering solution"). This solution, too, satisfies the Maxwell's equations. However, firstly, it is one more solution of those equations (which invalidates the theorem of the only solution known). Secondly, and the most important, electrical engineering solution does not explain the famous experimental fact.

The case in point is skin-effect. Solution to explain skin-effect should contain a non-linear radius-to-displacement current (flowing along the wire) dependence. According to Maxwell's equations, such dependence should fit with radial and circular electrical and magnetic intensities that have non-linear dependence from the radius. Electrical engineering solution offers none of these. Explanation of skin-effect bases on the Maxwell's equations, yet it does not follow from electrical engineering solution. It allows the statement that electrical engineering solution does not explain the famous experimental fact.

Now, refer to energy flux in wire. The existing idea of energy transfer through the wires is that the energy in a certain way is spreading outside the wire [13]. Such theory contradicts the Law of energy conservation. Indeed, the energy flow, travelling in the space must lose some part of the energy. But this fact was found neither experimentally, nor theoretically. But, most important, this theory contradicts the following experiment. Let us assume that through the central wire of coaxial cable runs constant current. This wire is isolated from the external energy flow. Then whence the energy flow compensating the heat losses in the wire comes? With the exception of loss in wire, the flux should penetrate into a load, e.g. winding of electrical motors covered with steel shrouds of the stator. This matter is omitted in the discussions of the existing theory.

The obtained solution of Maxwell's equations simulate a structure of an electromagnetic wave, in which there is a flow of electromagnetic energy propagating in and **along** the wire.

The resulting solution describes the electromagnetic wave

- in vacuum,
- in wire with alternating and constant current,
- in magnetic circuit of alternating current,
- in charging and charged capacitor – flat and spherical,
- in ball lightning,
- in the vicinity of solitary electrical charge.

The resulting solution allows us to explain

- twisted light
- single-wire transmission of energy,
- nature of the Earth's magnetism,
- nature of energy stored in a charged capacitor,
- nature of the energy stored in ball lightning, and some of its properties,
- functioning Milroy engine.

The solution obtained shows that path of the point, which moves along a cylinder of given radius in such a manner, that each intensity value varies harmonically with time, is described by a **helix**. This statement is true for an electromagnetic wave in the wire, in any environment, in vacuum - Fig. 4.

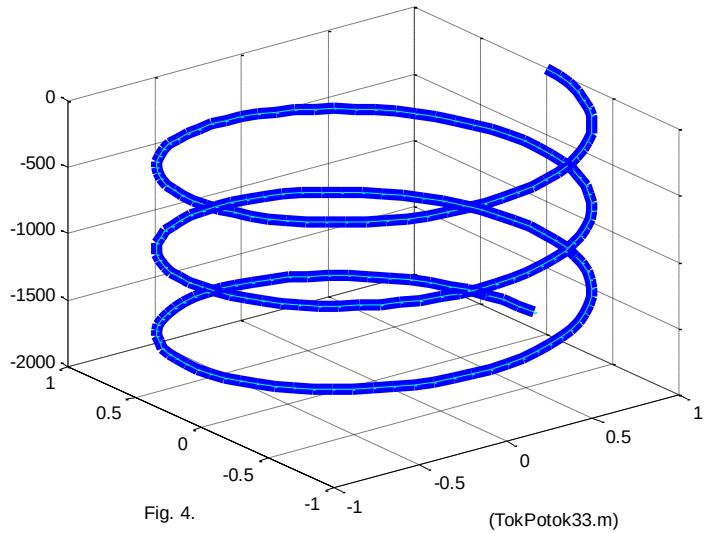

Fig. 4. (TokPotok33.m)

At each point, which moves along this helix, vectors of magnetic and electric intensities:

- exist only in the plane which is perpendicular to the helix axis, i.e. there only two projections of these vectors exist,
- vary in a sinusoidal manner,
- are shifted in phase by a quarter-period.

Resultant vectors:

- rotate in these plane,
- have constant moduli,
- are orthogonal to each other.

- Download the book here
- Watch the prospectus (and maybe buy) a printed book here.