Induced conductor net problem

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My article Coil and resistor induction paradox shows that the potential energy of electrons in an induced coil is not correctly described by Faraday's law. This is illustrated by Figure 1 in which a circular circuit with a resistor A is induced in a magnetic field; the resistance of the wire P is negligible. The inconsistency is that the electric field in the conductor wire P is zero and the moving electrons cannot collect energy. The present article exposes another problem: finding the potential in induced circuit with multiple resistor and branches.

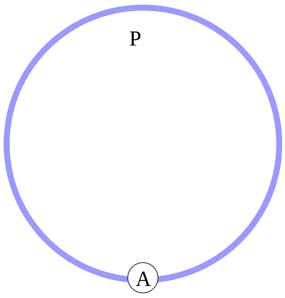

Figure 1

1. Induced conductor net

The circuit in Figure 1 has only one resistor and knowing the potential in the wire is unnecessary. For circuit with multiple resistors, knowing the potential of each resistor becomes essential. **Figure 2** presents a non-circular coil formed with wires P and Q and 2 resistors A and B whose input and output electrodes are A_i, A_o, B_i and B_o respectively. The magnetic flux through the coil is Φ whose variation rate is Φ'; the resistances are R_A and R_B. According to Faraday's law the total induced voltage and current are:

$$U = -\Phi', \qquad I = -\frac{\Phi'}{R_A + R_B} \qquad \textbf{(1)}$$

And the voltages across each resistor are:

$$\Delta U_A = R_A I, \qquad \Delta U_B = R_B I \qquad \textbf{(2)}$$

So, we know well the voltages across the resistors. But what is the potential of the resistors? Suppose the potential at the output electrode of resistor A is U_{Ao} and the voltage across the wire P is ΔU_P. The potential at the input electrode of resistor B with respect to U_{AO} is:

$$U_{Bi} = U_{Ao} + \Delta U_P \qquad \textbf{(3)}$$

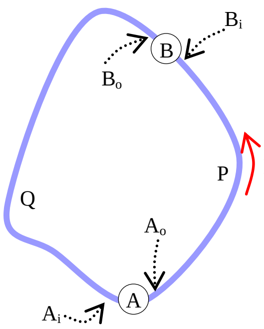

Figure 2

Can we compute U_{Bi} ? The answer is "no" because we do not know ΔU_P. If we admit that electric field is zero in conductor, then ΔU_P and ΔU_Q will be zero leading to a paradox. If we admit that there is induced electric field in the wires, as I have explained in Coil and resistor induction paradox, we will still have no idea about the induced voltage in these wires. Indeed, P and Q are non-loop wires for which Faraday's law does not apply at all.

Now, let us see Figure 3 which presents an induced double-coil with 3 resistors A, B and C which are connected through the wires P_i, Q_i and S_i with indices i equal to 1 or 2. For this circuit we ask: what are the potentials at the nodes M and N? The answer is: we have no way to know.

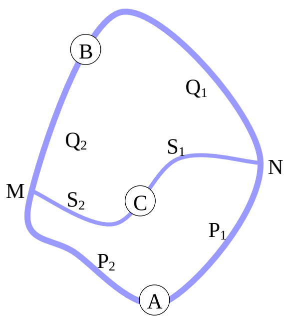

Figure 3

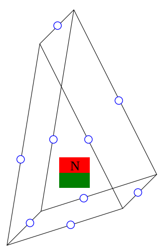

Figure 4

To make things funnier, we construct a 3D circuit in the form of a prism whose edges are wires with resistors (see **Figure 4**). The dots are resistors and the red-green rectangle is a varying electro-magnet. Let us ask: what are the potentials at the prism's summits?

2. Comments

Classical electromagnetic theory is claimed to be the most successful physical theory that explains any electromagnetic phenomenon in the world, from infinite small to infinite large. But it is unable to determine the potential in the above circuits. When it fails to solve such basic problem, can we trust its prediction on subatomic and galactic levels? If you see big holes in the foundation of a skyscraper, will you be confident in staying on its summit?

The crux of this problem is the induced field in non-loop wire for which no theoretical law exists. Since potential has definite value in any circuit, induced field does exist in non-loop wire. This field will not disappear just because we do not have a law for it. Facing such fundamental trouble the only right attitude is to search for new law so as to improve the theory. The defenders of the classical electromagnetism who reject all critics do not defend science but harm it by impeding improvement.

Induced field in non-loop wire and Lorentz force paradox show obvious discrepancy of theoretical prediction from physical reality. This means that experimental research will easily find unpredicted phenomena and yield valuable results to the researchers. My Corrected law of magnetic force and solution to Coil and resistor induction paradox give indication on where to look.

3. Computation of the currents

Just for information, here is the computation of the currents in the double- coil circuit in Figure 3.

Induced voltages in the loops AC and BC:	$\Delta \boldsymbol{U}_{AC} = -\Phi'_{\mathrm{AC}}$	$\Delta \boldsymbol{U}_{BC} = -\Phi'_{\mathrm{BC}}$
Voltages in the resistors:	$R_A I_A - R_C I_C = -\Phi'_{\mathrm{AC}}$	$R_B I_B + R_C I_C = -\Phi'_{\mathrm{BC}}$
Continuity of currents:	$I_B - I_A = I_C$	

Currents:

$$R_A I_A - R_C(I_B - I_A) = -\Phi'_{\mathrm{AC}}, \qquad R_B I_B + R_C(I_B - I_A) = -\Phi'_{\mathrm{BC}}$$

$$(R_A + R_C)I_A - R_C I_B = -\Phi'_{\mathrm{AC}}, \qquad -R_C I_A + (R_B + R_C)I_B = -\Phi'_{\mathrm{BC}}$$

$$I_A = -\frac{(R_B + R_C)\Phi'_{\mathrm{AC}} + R_C\Phi'_{\mathrm{BC}}}{(R_B + R_C)(R_A + R_C) - R_C R_C}$$

$$I_B = -\frac{R_C\Phi'_{\mathrm{AC}} + (R_A + R_C)\Phi'_{\mathrm{BC}}}{(R_A + R_C)(R_B + R_C) - R_C R_C}$$

$$I_C = I_B - I_A = \frac{R_B\Phi'_{\mathrm{AC}} - R_A\Phi'_{\mathrm{BC}}}{(R_B + R_C)(R_A + R_C) - R_C R_C}$$