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Crux of the controversy about Faraday's law

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I have posted 2 articles about Faraday's law that show surprising difference of voltage when we see the loop as a generator for the external load or compute by following the loop's wire. I have received critics. Here I clarify the situation.

In the article "Faraday's Law Paradox" http://pengkuanem.blogspot.com/2012/10/faradays-law-paradox.html , a loop is terminated by a small capacitor and induced by a steadily changing magnetic field (see the left part of the Figure 1). Around the capacitor, the voltage is given by Faraday's law:

$$V_D - V_A = EMF \tag{1}$$

In the article "Can EMF distribution be known?" http://pengkuanem.blogspot.com/2012/10/can-emf-distribution-be-known.html , the loop possesses 5 resistances and a load resistance closes the loop (see the right part of the Figure 1). The voltage around the load resistance is:

$$V_D - V_A = R_{load}\frac{EMF}{R_{load}+5R_{node}} \geq 0 \tag{2}$$

EMF is given by Faraday's law:

$$\mathrm{EMF} = -\frac{d}{dt}\iint_s \mathbf{B}\cdot d\mathbf{s} \tag{3}$$

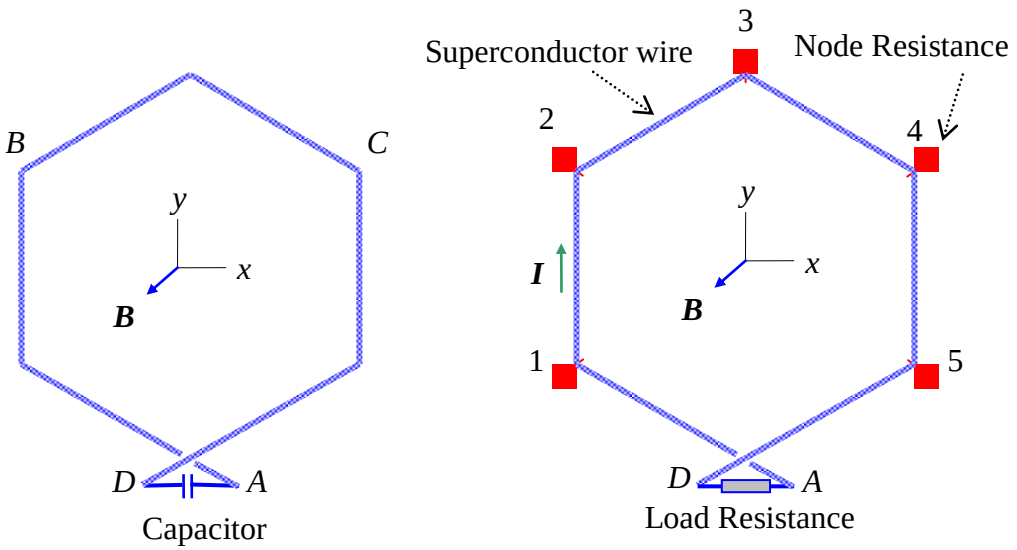

Figure 1

The above results are simple applications of Faraday's law and were accepted. What was controversial was the computation of the voltage by following the loop's wire. I proposed to compute it as below:

$$V_D - V_A = \int_{ABCD} E_{total}\,dl \tag{4}$$

But the critics said that this is to use a law for conservative field on a non-conservative one. I agree; $\mathbf{E}_{total}$ is the sum of the induce field $\mathbf{E}_{Faraday}$ and an electrostatic field $\mathbf{E}_{stat}$, and computation of a voltage by integrating through a path (see ABCD in the left part of the Figure 1) is for conservative field.

However, there must be a way to compute the voltage by following the loop's wire. Electromagnetism is a coherent theory and if one cannot provide a solution to this problem, this theory is not complete. Until now, I have not seen a valid solution after accumulated many thousand of read. Among the physicists who read my articles, there should be highly competent ones but none has given a solution.

The lack of valid proposal suggests that this is not an easy problem as it appears.