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Autogenerator of Richard VIALLE : part 1/2

Par : Pascuser – version du 02/10/2012 à 8h25

Translated by @michelsbench 02/02/2025 at 17.01

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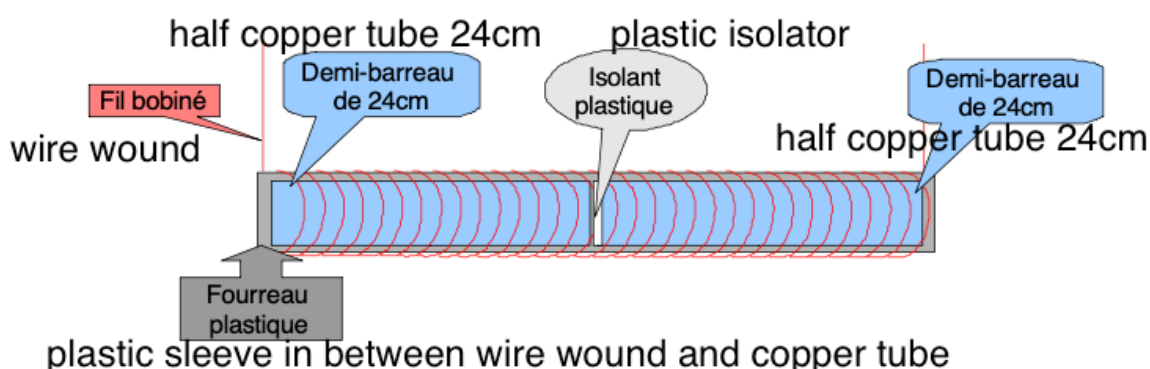
1st Autogenerator test: solid copper bar

Setup:

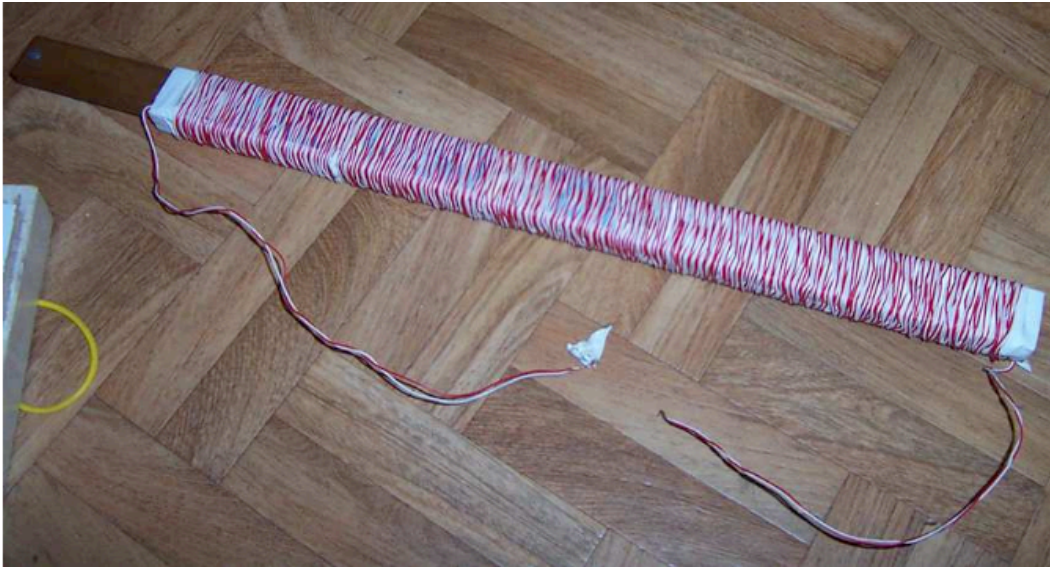
Richard VIALLE's first autogenerator was made up of two identical half-bars of solid copper 24cm long and of rectangular section 1cm x 3cm, separated by electrical tape (thickness <0.5mm) stuck on one of the ends of the one of the half-bars so that once in contact with each other, there is no electrical conductivity. These half-bars were taken of this size because they are a recycled element and Richard VIALLE made do with what he found (he was looking for a solid material and that was the only thing easily available).

The whole thing was wound by two parallel telephone wires of 0.5mm copper diameter each, with approximately 0.5mm of sheathing diameter (one red and one white).

In fact, for practical purposes, the telephone wires were wound on a plastic support of rectangular section serving as a sheath for the half-bars which were slipped into this sheath.



Richard VIALLE could slide the half-bars into the sheath more or less and remove a large part of a half-bar at will.



The purpose of parallel winding is to help reduce the skin effect a little.

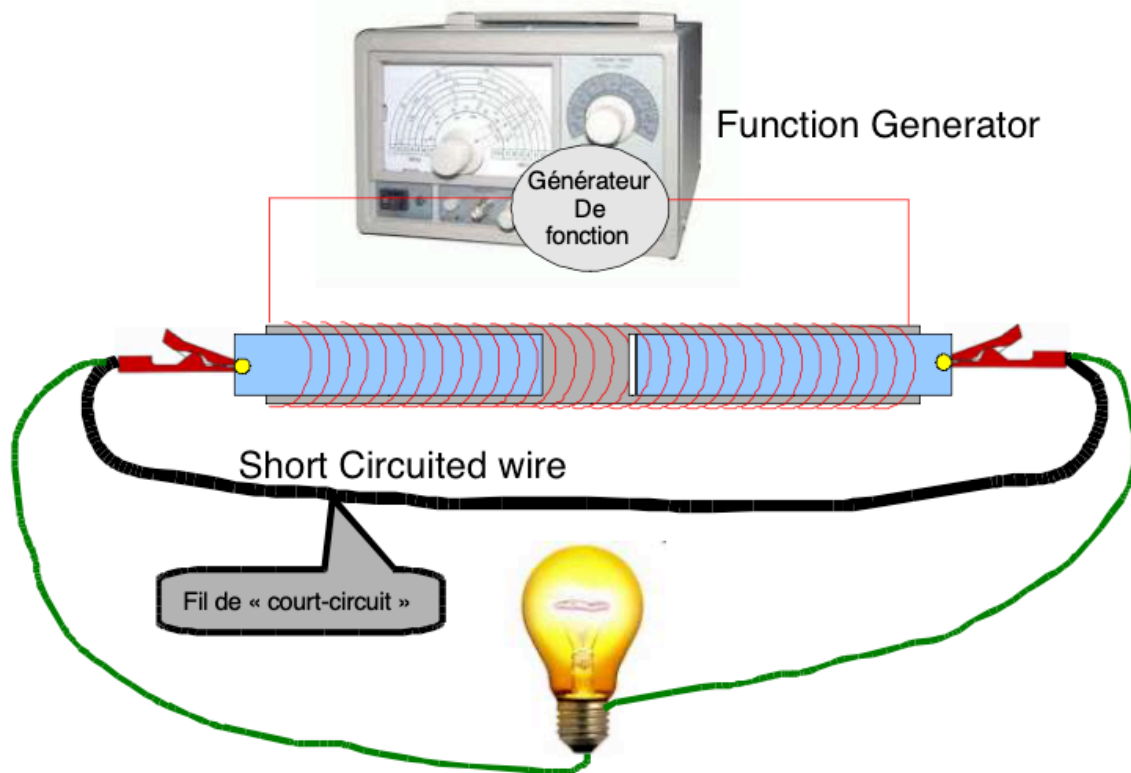
The resistance of the wires increases with frequency; this effect decreases with the diameter of the wires: smaller wires, less resistance due to skin effect. The ideal would be to have thousands of wires of micrometric diameter and isolated from each other to reduce the skin effect (Litz wires), but the input loss is already so low that trying to reduce it further with a purchase so expensive as Litz thread at this level is a real unnecessary waste. On the other hand, it will be very useful elsewhere, in the exit agreement; but we will talk about it in the U-shaped self-generating device where it was created by Richard VIALLE, to keep the historical aspect of the work.

Here there are two isolated ones: the red wire and the white wire. This is not much of an improvement over a single wire; and it might not have been done.

A hole is drilled at the end of each half-bar with a screw and a bolt placed in it, allowing an attachment area to be made on which an alligator clip can be attached.



Connexion électrique :
Electrical Connection



At the Input :

A function generator is connected directly to the two ends of the winding wire which surrounds the sheath, without an amplifier in this first low-power version of the autogenerator.

The generator that Richard VIALLE initially had was an old needle generator which did not go below a limiting frequency (it seems that 10MHz was the low limiting frequency). It delivered 4 to 8V effective at the output depending on the frequency (voltage decreasing at the output with increasing frequency).

At the Output:

We connect a conductive wire to the ends of each half-bar of copper (using an alligator clip), and we connect them together, creating a short circuit between the two half-bars.

This is achieved by a laboratory cord with 1mm diameter copper wire with banana plugs at the ends called "1 meter long" (but measured at 121cm from the tip of one banana plug to the other tip; each end banana plug measuring a total length of 4.7cm); connected to crocodile clips.

This short circuit is essential for the proper functioning of the autogenerator. In fact, the leakage choke of this wire has an impedance at the operating frequency which produces a voltage across the wire crossed by the current leaving the half-bars. So this short circuit

does not cause the voltage to drop to zero, as one might falsely think (this would be true in direct current)

Without this wire, the voltage across the wire (and therefore the half-bars) is high when empty, but it collapses as soon as you plug in a bulb, even one of low voltage, which only lights up very dimly. With this wire, we obtain sufficient active power to light bulbs of various sizes (2.5V to 6V) quite brightly; there is no significant voltage collapse effect. The measured no-load voltage was around 11V with the wire alone.

Furthermore, when Richard VIALLE removes the electrical tape which separates the two half-bars and places them in electrical contact, there is no longer any voltage at the terminals (the self-generating effect has disappeared). So electrical insulation (scotch tape, air, plastic) is essential.

We therefore also connect to the terminals of the wire (therefore to the terminals of the half-bars) a load (electric bulb) by wires terminated by crocodile clips.

Setup of the experiment:

We set the input of the function generator with a sinewave signal with a frequency of 25MHz. It is at this frequency (in fact between 25MHz and 27MHz, the display not being precise it only had the reading to the nearest MegaHertz) that the autogenerator worked best. The bulb (4V/40mA) connected as a load lights up with good brightness (consuming approximately its nominal power of $4V \times 40mA = 0.16$ watts).

When the two copper half-bars are joined together, the total length immersed in the magnetic field is $48cm=0.48m$.

According to the resonance calculation formulas of Richard VIALLE (see below document) we should have an adapted resonance frequency of $f=5.18MHz$

However, the function generator he had did not allow him to work at this frequency. Note that the frequency on which the autogenerator operated is approximately 5 times the tuning frequency, the 5th harmonic. It is on this harmonic rather than on another that he obtained a maximum power output (visible by maximum illumination on a bulb). Since then he has a digital generator capable of all frequencies and has obtained 100 times the output power of the 1st autogenerator in the current versions.

The bulbs mainly used were 4V/40mA bulbs.

Why was it on this harmonic 5 rather than a lower or higher harmonic accessible to the function generator that we had the maximum power, Richard VIALLE does not have the answer (he did not study the behavior outside the resonant frequency in harmonics). He couldn't work on the main tuning frequency at that time anyway; having no other function generator at his disposal and observed what he could obtain.

Modification of the material of the half-bars:

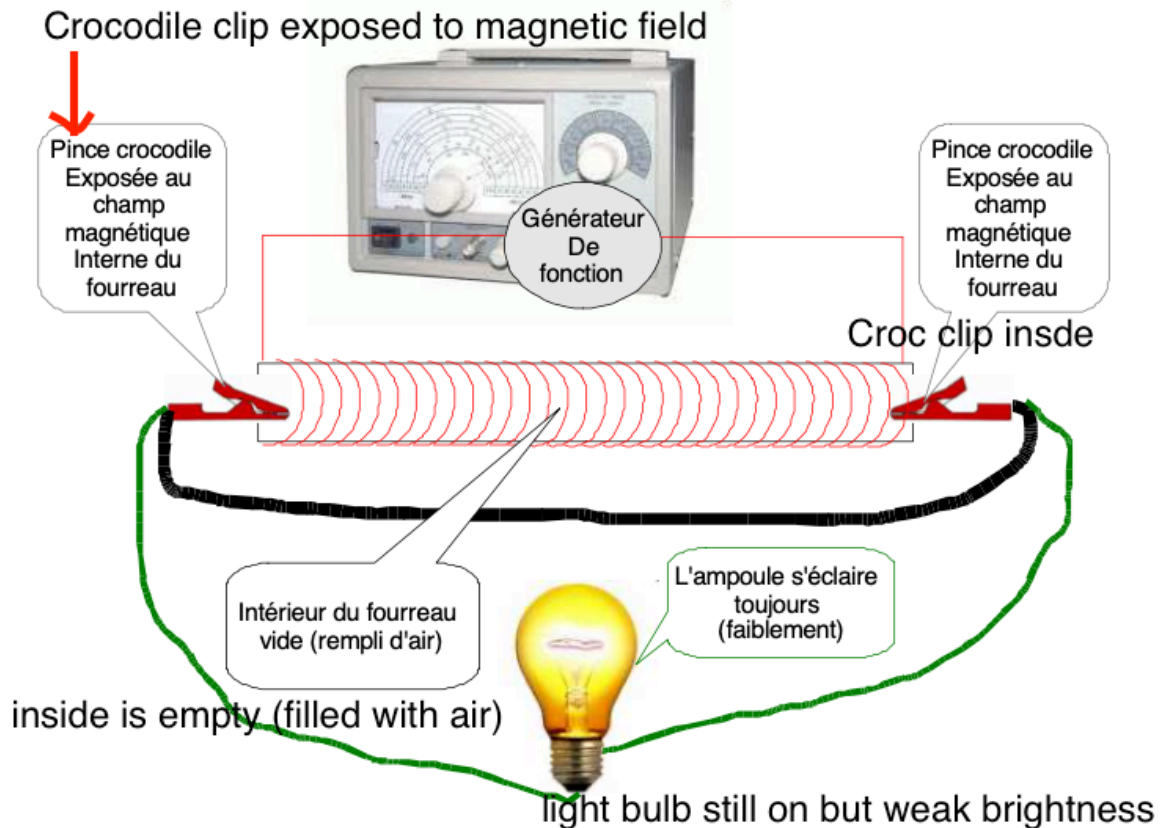
We can replace one or both copper half-bars with a plastic half-bar of the same size or simply let the air serve as a half-bar.

What must be understood in Richard's theory and which we also observe in experimental practice is that copper, or plastic or air do exactly the same work of creating electrical energy by electrons bound to atoms (electrons bound to atoms of copper or plastic or air). Whether the material is a conductor or an insulator, the magnetic field surrounding them makes the bound electrons of these atoms vibrate and therefore Richard VIALLE's principle must work with insulators too.

On the other hand, the number of linked electrons being different, the calculations then differ for the current and voltage generated. And the big difference is that since air or plastic has no free electrons, there will be no hot current (circulation of free electrons in the body of the half-bars). This changes the power produced at the output.

I was able to observe at Richard VIALLE's, the first time I saw him, in the company of Alain B., that by inserting a half-bar of plastic in place of each half-bar of copper and placing the crocodile clips on it, the bulb at the terminals lit up! (still with the short-circuit wire). It lit up more weakly, but lit up. Same thing by removing the half-bars of plastic and leaving the inside empty (i.e. filled with air). The bulb lit up even more weakly than with the plastic. There the crocodile clips had to be held with the hand in the air, in the center of the two exits of the sheath. Surprising, isn't it?

In the case where we decide to take the output voltage at the terminals of a piece of plastic or a column of air that replaces the internal copper, it is still necessary for a piece of the crocodile clip of the conductive wire that is connected to this piece of half-bar of plastic (or in the internal air) to be immersed in the magnetic field of the winding that surrounds the sheath, to also be part of the device and for the free electrons of this piece of wire to be set in motion in order to be able to create a current that will flow through the external circuit. If we place the crocodile clips at a distance from the ends of the sheath, nothing happens: no lighting. They must enter a little into the internal magnetic field.



Research into the possibly "normal" origin of this energy output:

After seeing this at Richard VIALLE's, this aspect of output production without a half-bar of copper inside made me think that the output current could be just a normal effect due to a capacitive coupling between the winding serving as a capacitor plate and the crocodile clip (or any other piece of the conductive wire) serving as a second plate, the air and the plastic of the sheath separating them being the dielectric. Finally, the crocodile clip would only derive current from the input, a current that would not come from any abnormal effect. After discussing it at length with Richard VIALLE and tests and measurements were carried out by me as well as by Alain B. and Richard VIALLE, we can affirm that it is absolutely not a capacitive coupling that derives energy from the input that can explain this phenomenon.

The arguments that show that this is not the case: the calculation of the current flowing in the very bad capacitor constituted by the coil/crocodile clip capacitance shows that we should really have much less than what comes out in the bulb. Considerations on the potential differences necessary to set the currents in motion by this capacitive effect by having done numerous tests of connection of certain points to the ground show that there is not a sufficient potential difference.

And short-circuiting tests of this pseudo-capacitive effect by aluminum sheets connected to the ground of the function generator show that the output production remains present (very slightly reduced). So a capacitive effect, there may be one, but it is largely negligible compared to what we measure, and also the current calculations, measurement of potential difference and short-circuiting experiment of this effect show that a large abnormal effect remains which is NOT AT ALL explainable by the capacitive derivation from the input.

Electromagnetic radiation cannot explain what is obtained either. Not only does the calculation show that the coil made by the wire surrounding the sheath has a length totally unsuitable for radiation of the emitted wavelength, even by harmonics; but in addition the radiated energy is not sufficient to cause lighting by induction effect.

Finally, wrapping the entire half-bar with its winding in a sheet of aluminum foil grounded showed that the output production was still present (but reduced; in fact the frequency of obtaining overunity was modified, by modifying the frequency one could obtain the same brightness). So radiation is not the cause either.

In any case, to conclude, the measurements of power actually consumed at the input were then able to show that the input power is much lower than the output power (whether the input power is then radiated or capacitively coupled to the output or by any other artifact, and the Joule effect losses in the input winding that consume it). This shows that there is an anomaly and therefore indeed overunity.

Input and output power measurements:

1) Ecole Polytechnique de Lausanne: with an oscilloscope in the physical measurement laboratory

When Swiss sponsors contacted Richard VIALLE, he had this self-generating device. He was invited to come to Switzerland with his self-generating bar and his function generator to power it.

They organized a measurement of the input power and the output power by a person working at the Ecole Polytechnique de Lausanne in Switzerland, in the physical measurements section.

There, a physicist, a specialist in sound and waves, used a high-performance oscilloscope and a 1 ohm metal resistor to measure the voltage across the input winding of the autogenerator and across the resistor that had been put in series. With the resistor in series he determined the current, and he measured the cosine of the phase shift angle. An internal calculation function of the oscilloscope gave the power with this data.

During this time the autogenerator delivered 0.16 Watts on a 4V and 40mA bulb. The measurement carried out gave an input consumption of 0.000001 Watt = 10^{-6} Watt, or: COP = 160000.

Then the mass of the generator was disconnected from the half-bar, which meant that the half-bar remained powered by the only "hot point" coming out of the function generator. So we only had the antenna effect, radiation, and even less the resistive skin effect as losses. So even less at the input. The bulb lit up a little more weakly, but remained clearly lit.

The person who was taking the measurement exclaimed "there is nothing at the input"

The power consumed at the input was considered zero, below the measurement threshold of the device. Virtually we could then have given $COP = \text{infinity}$, but obviously that would be wrong because there are losses by radiation, even if they are minimal. In any case the COP was therefore even greater than before. And this demonstrates in passing that, as indicated, the antenna made by the winding is totally unsuitable for radiating a significant fraction of the input power; because it is not made for that.

This measurement had been made with Richard VIALLE's function generator limited in frequency between 25Mhz and 27MHz.

2) High Frequency Wattmeter at a friend of Richard VIALLE

Another measurement was carried out at a friend of Richard VIALLE by a direct measurement of input and output power by a High Frequency Wattmeter, therefore without going through a resistor and a cosine phi on an oscilloscope. This time it was the U generator that had been put on the measurement bench, but the results were identical in principle with a COP of at least 10,000.

3) My measurements

I myself have carried out power measurements on a 2-meter linear generator which gave a minimum COP of 300 to 580 on the same equipment with measuring equipment that did not have great precision (measurement of phi on an oscilloscope and minimization of the measurement by subtracting the reading error). These COPs are minimum values and may have been much larger.

Calculation of the resonance frequency according to the length of the total bar (length of the copper + intercalated insulation):

In the scanned draft sheet that follows, I noted α the average angle of the electron orbits relative to the axis of the bar. Richard VIALLE was able to experimentally measure by another experiment that $\cos^2(\alpha) \approx 0.45$

(To measure it, Richard VIALLE considered a measurement in which this angle appeared by its cosine and made the ratio between what was measured in real output on the assembly and what should appear taking into account α . This gave a simple equation to determine $\cos(\alpha)$)

This angle α only appears in the cosine. We will therefore use this value of $\cos^2(\alpha) \approx 0.45$ in the calculations.

I also noted α the fine structure constant,

J'ai aussi noté α la constante de structure fine,

$$\alpha = \frac{e^2}{\hbar c 4\pi\epsilon_0} = \frac{1}{137,035999679(94)} = 7,2973525376(50) \times 10^{-3}$$

It only appears in the calculation of the speed of the electron which gives: $v=c \cdot \alpha$ (c : speed of light)

It would have been better if I had noted the angle of the orbits differently to avoid confusion, but it is always afterwards that we realize what should have been done. So that being said, you will be able to read the next page without possible confusion now!

We will remember at the end of the calculation page that we have a simple numerical formula to calculate the resonance frequency to apply to the bar whatever its length:

$$f \approx \frac{3,59 \cdot 10^6}{\sqrt{L}} \text{ en Hertz}$$

with L : length in meters of the bar (copper)

Calcul de la fréquence à appliquer au barreau

Voici comment on fait les calculs de Richard VIALLE pour arriver à la fréquence de résonance adaptée au barreau :

$$\overbrace{\frac{1}{2} A \frac{\rho}{3} l c \alpha m_0 (K \Delta R_0) \omega^2}^{\text{Puissance "mécanique"}} = \underbrace{\frac{e K \Delta R_0}{4 \pi \epsilon_0 (R_0 \cos \alpha)^2}}_U \times \underbrace{A \frac{\rho}{3} e (K \Delta R_0)}_I$$

$$\Leftrightarrow \frac{l c \alpha m_0 \omega}{2} = \frac{e^2 K \Delta R_0}{4 \pi \epsilon_0 R_0^2 \cos^2 \alpha} \quad \text{avec } K = \frac{R_0 \omega_0}{2 \Delta R_0 \omega}$$

$$\Leftrightarrow \frac{l c \alpha m_0 \omega}{2} = \frac{e^2 R_0 \omega_0 \Delta R_0}{4 \pi \epsilon_0 R_0^2 \cos^2 \alpha \times 2 \Delta R_0 \omega}$$

$$\Leftrightarrow \omega^2 = \frac{e^2 \omega_0}{c \alpha m_0 l \times 4 \pi \epsilon_0 R_0 \cos^2 \alpha} \quad \text{qui relie } \omega \text{ à } l$$

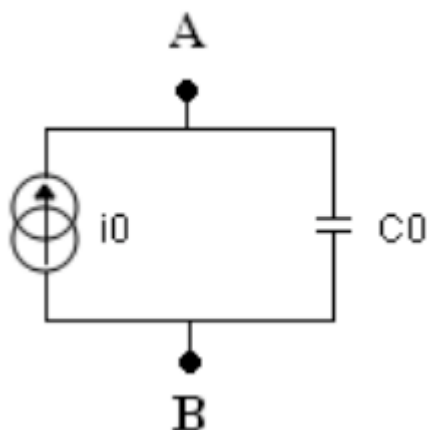
$$\Leftrightarrow \omega = \frac{e}{\cos \alpha} \sqrt{\frac{\omega_0}{c \alpha m_0 \times 4 \pi \epsilon_0 R_0}} \times \frac{1}{\sqrt{l}} \quad \text{et avec } \omega = 2 \pi f$$

$$\Leftrightarrow f = \frac{e}{2 \pi \cos \alpha} \sqrt{\frac{\omega_0}{c \alpha m_0 \times 4 \pi \epsilon_0 R_0}} \approx \frac{3,59 \times 10^6}{\sqrt{l}} \quad \begin{matrix} \omega_0 = 2 \pi f_0 \\ f_0 = 16,7 \text{ MHz} \\ (3,59 \text{ MHz pour } l = 1 \text{ m}) \end{matrix}$$

Equivalent electrical diagram of the self-generating assembly:

Ideal diagram at no load:

Richard VIALLE schematizes the production of electrical energy from his ideal self-generator at no load output as being that of a current generator (so-called "cold" current) represented as follows:



On the left, a current generator outputting a current i_0 (which Richard VIALLE calls the "cold current"). This current is "cold" because it does not cause any heat dissipation by "friction". When an electron orbits the nucleus, it does so without "friction" while the free electrons that pass through a conductor "rub" on the defects of this conductor (in quantum vision, we would speak of rebounds of the wave function of the electrons on the wave functions of the defects of the crystal lattice of the conducting metal because of the thermal effects and anomalies of various constitutions, in short).

This alternating current i_0 at the frequency imposed by the sinusoidal function generator is the current of bound electrons of the half-bars produced by the Richard VIALLE effect under the effect of the amplification of the oscillation of the bound electrons of the total bar by the magnetism of the winding surrounding the bar.

C_0 is the virtual capacitance representing the theoretical phase shift between cold current and voltage at the terminals of the bar. It has nothing to do with the capacity due to the electrical cut between the two half-bars. Richard VIALLE shows in his theoretical calculations that the current available at the output of half-bars A and B is out of phase with the voltage at terminals A and B in exactly the same way as the phase shift produced by a fictitious capacitor. He therefore calls it "virtual" capacity.

This is followed by a page scan showing the existence of the virtual capacity C_0 by theory. A numerical application is carried out for another type of autogenerator, similar in principle, called "U". Do not take it into account here, since we remain in this first time, limited to the 1st version of autogenerator.

Calcul de la Capacité virtuelle du barreau autogénérateur

[expérience sur barreau de 1m en U, tube $\phi_{ext} = 10\text{cm}$ et $\phi_{int} = 8\text{mm}$]

$$I_0 = N \times \frac{2\ell}{3} \times S \times e \times K \times \Delta R_0 \times \omega \quad \text{courant "froid" du barreau}$$

$$I = I_0 \sin(\omega t)$$

$S =$ section du barreau

La mesure de la tension aux bornes du barreau montre un déphasage. Soit il est inductif, soit capacitif (il n'y a aucune résistance à prendre en compte ici)

Le calcul de la tension donne :

$$U_0 = \frac{e K \Delta R_0}{4\pi \epsilon_0 R_0^2 \cos^2 \alpha}$$

$$\cos^2 \alpha \approx 0,45 \text{ (expérimental)}$$

$$R_0 = \text{rayon de Bohr} = 5,2917 \times 10^{-11} \text{ m}$$

$$\epsilon_0 = \frac{1}{36\pi} 10^{-9} = 8,854 \times 10^{-12}$$

$$U = U_0 \sin(\omega t + \varphi) \quad \text{où } \varphi: \text{déphasage entre } U \text{ et } I$$

$$\frac{U_0}{I_0} = \frac{\cancel{e K \Delta R_0}}{4\pi \epsilon_0 R_0^2 \cos^2 \alpha} = \frac{1}{N \times \frac{2\ell}{3} S \times \cancel{e K \Delta R_0} \omega} = \frac{1}{N \times \frac{2\ell}{3} S \times 4\pi \epsilon_0 R_0^2 \cos^2 \alpha \omega}$$

donc on peut écrire $\frac{U_0}{I_0} = \frac{1}{C_0 \omega}$ avec la capacité virtuelle :

$$C_0 = N \times \frac{2\ell}{3} \cos^2 \alpha \times S \times 4\pi \epsilon_0 R_0^2$$

$$N = 8,49 \times 10^{28} \text{ pour le cuivre}$$

$$C_0 = \frac{\text{Nb atomes}}{\text{m}^3} \times \frac{\text{nb électrons par atome}}{3} \times \cos^2 \alpha \times 4\pi S \epsilon_0 R_0^2 \approx 3,14 \text{ pF pour le barreau de 1m en U}$$

Important note on alternating current:

Indeed, in alternating current we know that electrons do not move over large distances as in direct current. In sinusoidal alternating current, an electron is pushed in one direction, then pushed equally in the opposite direction, and so on. So it does not move on average, but it vibrates on either side of its average position. The higher the frequency, the lower the amplitude of the vibration because it does not have time to move in one direction before the opposite voltage sends it to the other side. We could say that the higher the frequency, the more the electrons stay in place.

However, we clearly define the notion of electric "current" in alternating current, although electric current is the movement of electric charges over time. However, we cannot really say that the charge of the electron moves, it vibrates. In fact, there is no need for a macroscopic movement through the entire circuit of an electron for its charge to move. It is enough to consider the infinitely small path that it will travel during a half-alternation of the vibration and calculate the number of charge carriers that will cross the fictitious section of the conductor considered, which has no thickness, so the crossing will be done even if the distance traveled is small.

What will really travel through the circuit is the electric wave, the electromagnetic pulse due to the shock of the electrons against each other when they are vibrated. This electromagnetic pulse moves at the speed of light in the conductive copper. It alone achieves a real movement in the conductor. It is analogous to metal balls placed in single file next to each other and suspended by a wire from a bar.

If we take a ball at one end and strike it against the chain formed by the others, an impulse will be transmitted very quickly through the entire chain and the last ball in the chain carries the impulse with it and is propelled. The balls are the electrons and the initial impulses are those generating the alternating current. The impulse that travels through the chain is the electromagnetic impulse. The electrons repel each other by their electrical charge and this is what allows the "contact" between each electron that can "press" on the neighbor.

So the electrons do not need to travel a long way and therefore do not need to be very free in their movements for us to define the notion of alternating current at high frequency. However, we must be in a conductive material for this because in an insulating material, an impulse given to an electron bound around an atom will not be transmitted to the neighboring electron because the electron remains orbiting around the atom that keeps it prisoner, and therefore no transmission of impulse in the axis of emission of the impulse to an electron of the neighboring atom (which is too far and not sensitive to this transmission, the electrostatic attraction of the nucleus on the electron is too great to allow this), therefore no alternating current. This is why we only have current in conductors, which have electrons free to be able to move to the neighboring electron in the axis of transmission of the impulse.

Be careful, I am not saying that electrons do not have a speed in an alternating current. They have a non-zero speed at all times except when it is canceled to become the opposite. But on average the speed is zero. The speed oscillates from a maximum to a strictly opposite minimum in the symmetrical sinusoidal current. But the electrons do not go very far, their back and forth movement with identical central position is a vibration. Their varying speed is the cause of the generation of a magnetic field varying at the same frequency, so do not say that they have no speed!

Using the remark on alternating current to define cold current:

If we now take the case of the Richard VIALLE effect, and consider the bound electrons; we have a macroscopic phenomenon of oscillation of the electrons on either side of their average orbit (Bohr radius). In the direction of the bar, we can look at the component of this oscillation and we then see that all the bound electrons of the material oscillate in one direction, then in the other.

It is not a pulse emitted at one end that is transmitted and is responsible for this (the electrons would have to be free for that); but the effect amounts to the same; even if the cause is different: we have an accentuated movement in one direction of the bar in a synchronized way (by means of the oscillating magnetic field which gives this additional oscillating movement to the electrons); then in the other direction.

We have a synchronization (due to the fact that the magnetic field is identical at every point of the bar at a given time, neglecting the small differences due to the speed of light which is the speed of travel of the current of the magnetizing coil and therefore the speed of transmission of the magnetic field to the entire bar).

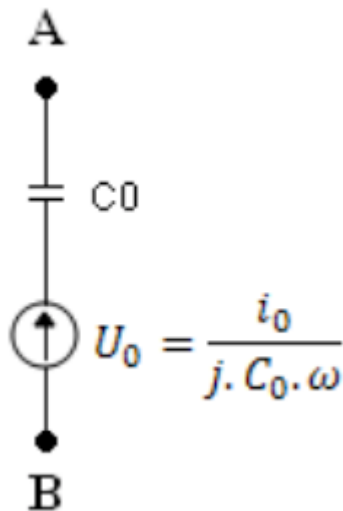
Now this is equivalent (not identical but equivalent) to a transmission of impulse along the bar coming from a source generating these impulses. That is to say that the bar behaves similarly to the existence of an alternating current but which would be propagated only by the bound electrons.

So we can legitimately consider that we have an alternating current flowing through the bar at the frequency of the function generator. This current ("cold") is however only an electrical vibration which flows through the bar in a synchronized way and which does not allow the exit of electrons into an external circuit.

If we want to use the previous electrical diagram, we must be aware that the cold current will NEVER come out of the bar, it is a synchronized movement of the material of the bar by the magnetic field that plunges into it. The only current that can come out of the bar is the current of the free electrons of the bar, propelled by the electric field produced by the cause, the cold current.

This cold current only exists as the cause of the production of an internal voltage that can set in motion the free electrons of any conductor connected to the bar. The only current that can

come out of the bar is a current of free electrons. So we must change the equivalent schematic to not believe that i_0 comes out of the bar, not this one:



This electrical model of the autogenerator is pretty much the ONLY certainty in the electrical model of the output. Indeed it comes from the calculation posed linking cold current and produced voltage.

All other model considerations that will follow are only elaborations based on various considerations that can be called into question at any time by experience or other new considerations. This is the domain of research!

Diagram in the absence of a cut:

If the autogenerator were not electrically cut in its middle, then we would have a circulation of a current of free electrons (i.e. electromagnetic pulses synchronized in the free electrons produced by the generator that represent the bound electrons). The free electrons would circulate in the total bar (in fact, as we said, they do not really circulate, it is their pulse that would circulate) under the effect of the cold current wave (**in phase with the cold current in a pure resistive conductor, without reactive magnetic braking or reactive capacitive braking**)

So clearly, the free electrons circulate internally in such a way as to destroy the electric field created by the Richard VIALLE effect in the autogenerator, which collapses the overall current and the overall voltage at the terminals of the bar. So letting these electrons circulate amounts to letting any self-generating effect disappear (or greatly reduce).

We could say that the high-frequency alternating current still flows through the two half-bars on the uncut part and therefore we have the same concern of canceling the electric field within these bars. This is true, except that it is not possible from one bar to the other, because the pulse does not cross the cut and therefore we still have an electric field that remains created between the bars by the self-generating effect and which cannot be

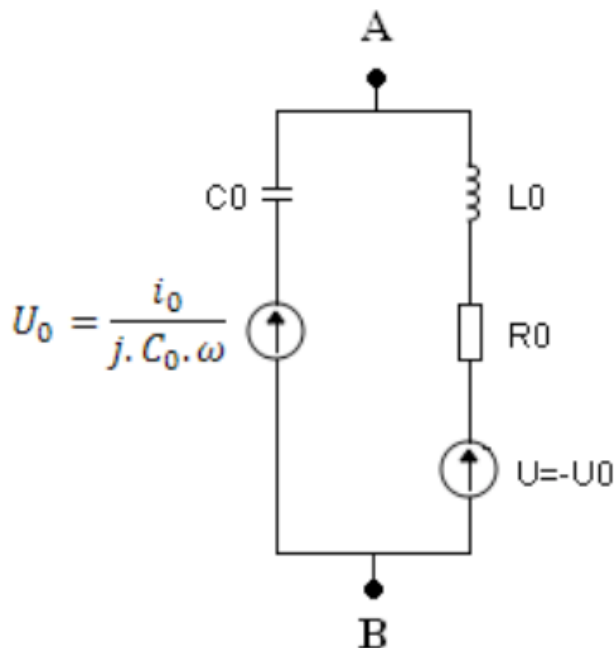
compensated by electromagnetic pulses that cross the cut and set the electrons in motion; even if the rest of the free electrons of the half-bars are traveled by pulses that collapse the electric field that is present WITHIN the half-bars.

It is therefore the cut that preserves the existence of an electric field between the half-bars and which therefore preserves the self-generating effect.

We can clearly see the limit of this reasoning since we still have a capacity effect by the electrical cut between the two half-bars, an effect which precisely allows the charges on one side to transmit impulses to the other side by proximity. However, the current which can flow in this capacity is very small because the capacity between bars is expressed at most at a hundred pico farads if the bars are joined by thin electrical tape or in pico farads with a thick plastic space (impedance of a few hundred ohms if we are very close or a few tens of thousands of ohms if we have a good separation at the cut) depending on the distance between half-bars.

This means that the collapse of the self-generating effect is all the weaker as the cut is better (very low capacity), which seems logical.

In the event of no cut, we would therefore have the following diagram:



Free electrons experience resistance when they generate a current, and so we have a resistance R_0 to add in the schematic on the side of the current generator i on the right (and the copper bar must therefore heat up under the effect of this "hot current").

L_0 is the leakage inductance of the entire bar (leakage inductance due to the passage of free electrons). It represents the effect of magnetic energy storage by free electrons during their vibration in the axis of the bar.

The two currents will share the same bar, some as a cold current of bound electrons and others as a current of free electrons.

The left branch describes the current of bound electrons (cold current) and the right branch the current of free electrons (hot current).

We could say that C_0 only counts for bound electrons, the cold current (no free electron can pass through C_0 which does not really exist in itself, it is virtual).

C_0 expresses the phase shift between the electrical voltage at the terminals of the bar and the cold current, but **if a current of free electrons is set in motion, it will be in phase with the cold current (if the conductor is purely resistive, if it is reactive, it will create a magnetic or capacitive braking and therefore an additional phase shift, a "delay" which is added)**, therefore out of phase with the voltage in the same way. So C_0 also appears in any passage of free electron current.

The diagram may not be entirely accurate but it means that a current of free electrons is created which creates a compensatory voltage to the voltage caused by the bound electrons, leaving an overall voltage of zero across the bar.

Now begin considerations of which we do not know if they are exact or not. It is up to the experiments to allow to decide and refine the understanding of what is happening or not more complex.

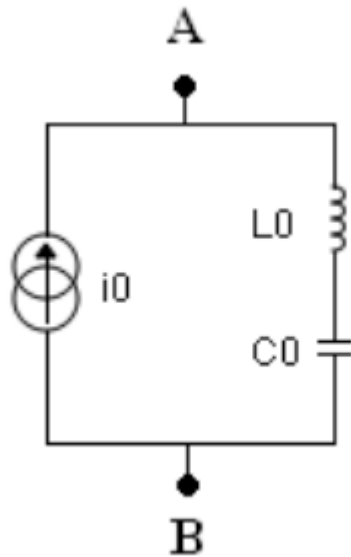
The interpretations and models are what we make of them. But the superunitary experience is there and undeniable. Not having a completed model does not mean in any way that we do not have a phenomenon already important and usable. The rest of the document is an attempt to predict and control the obtained diagram, currently under development.

Real diagram under load:

If any current leaves a half-bar through an external circuit to reach the other half-bar, it produces a parasitic magnetic field by crossing the bar. It is a bit like if we had restored the electrical cut in the bar, except that instead of circulating internally the current circulates externally.

If we connect a load at the output, to the terminals of two half-bars, the free electrons will be able to create a current from one half-bar to reach the other half-bar by circulating through the external load, by the effect of the sinusoidal alternating current (it being understood that as we have already said this is a bad way of saying things because the electrons only vibrate and it is the electromagnetic pulse that travels completely).

The diagram of the **real** autogenerator when it is **under load** is for the part equivalent to the bar only:

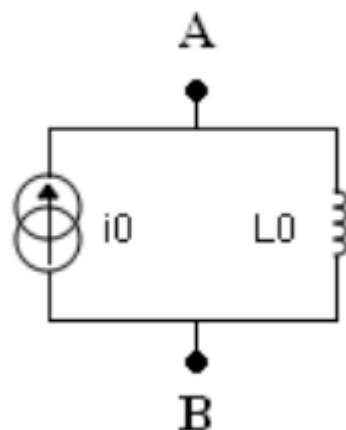


L^0 is the leakage inductance of the entire bar for the current of free electrons that will leave the bar through the external load (we said that there is a load, but here we have not materialized it, we are dealing with the "bar" part).

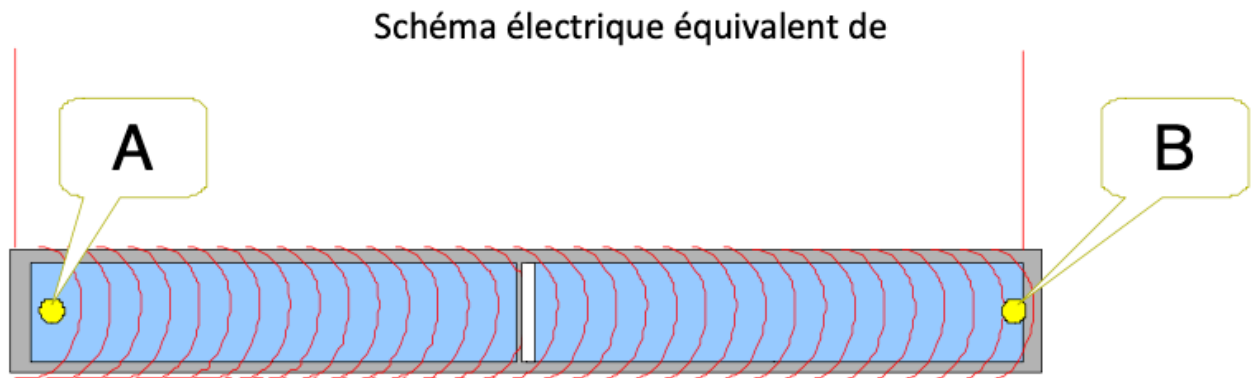
Now at the considered operating frequency (quite high), we can show that the impedance produced by the virtual capacitor of capacitance C_0 is low compared to that produced by the inductance L_0 .

So we can neglect the first impedance in front of the second; this amounts to saying that we can erase the capacitor of capacitance C^0 in front of the inductance L_0 .

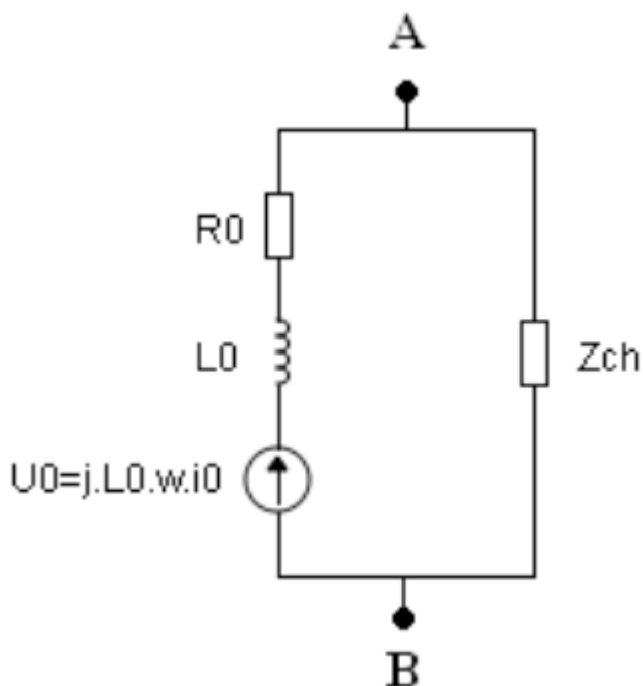
The real generator under load for the bar part only can be considered as being finally schematized in this case by:



The Equivalent electric diagram is:



We can also add in series with L_0 a resistance R_0 which is the skin effect resistance of the electrons crossing the copper, to be more rigorous. By switching to an equivalent voltage generator diagram we obtain, with the load:



The cold current i_0 vibrates in phase the free electrons that flow through the leakage inductor and send the current to the outside of the circuit.

The Thévenin generator equivalent to the previous Norton generator produces a voltage of $U_0 = j.L_0.\omega.i_0$

This voltage (an electric field) accelerates the free electrons of the half-bars (makes them vibrate because we are in alternating current) and the "hot" current thus generated (which

has nothing to do with the cold current except that the latter is the cause) crosses the leakage inductor of the bar: here we have an inductor for free electrons and we make this leakage inductor L_0 appear. And of course the bar has a resistance for the free electrons that flow through it, which is also increased by the skin effect on the bar. This resistance is R_0 .

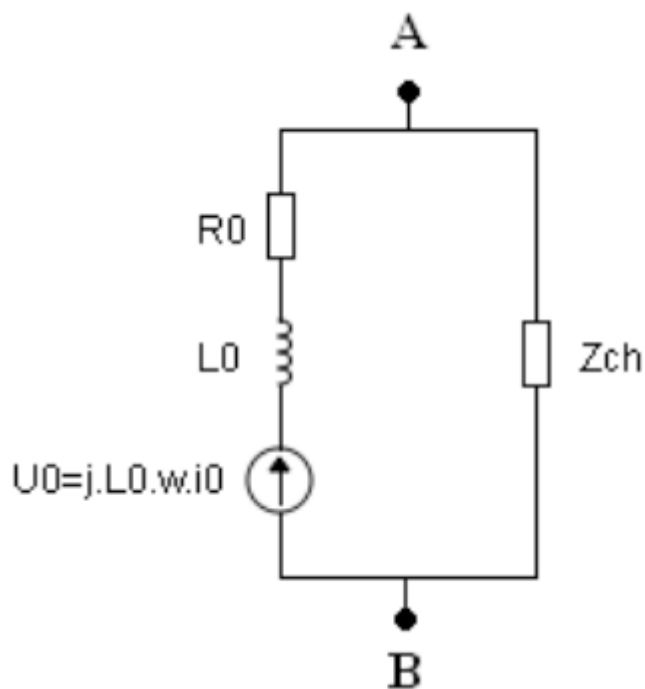
Between A and B we find a new model of the autogenerator, but which is only valid if a load Z_{ch} is connected to the terminals (so that the "hot" current is established).

Real diagram under load with the short-circuit wire:

If we connect a "short-circuit" wire to the terminals of the autogenerator, as is the case in the experiment, this wire will be traversed by a current; and it will have a leakage inductance L and a classic resistance to which is added a resistance due to the High Frequency skin effect called R .

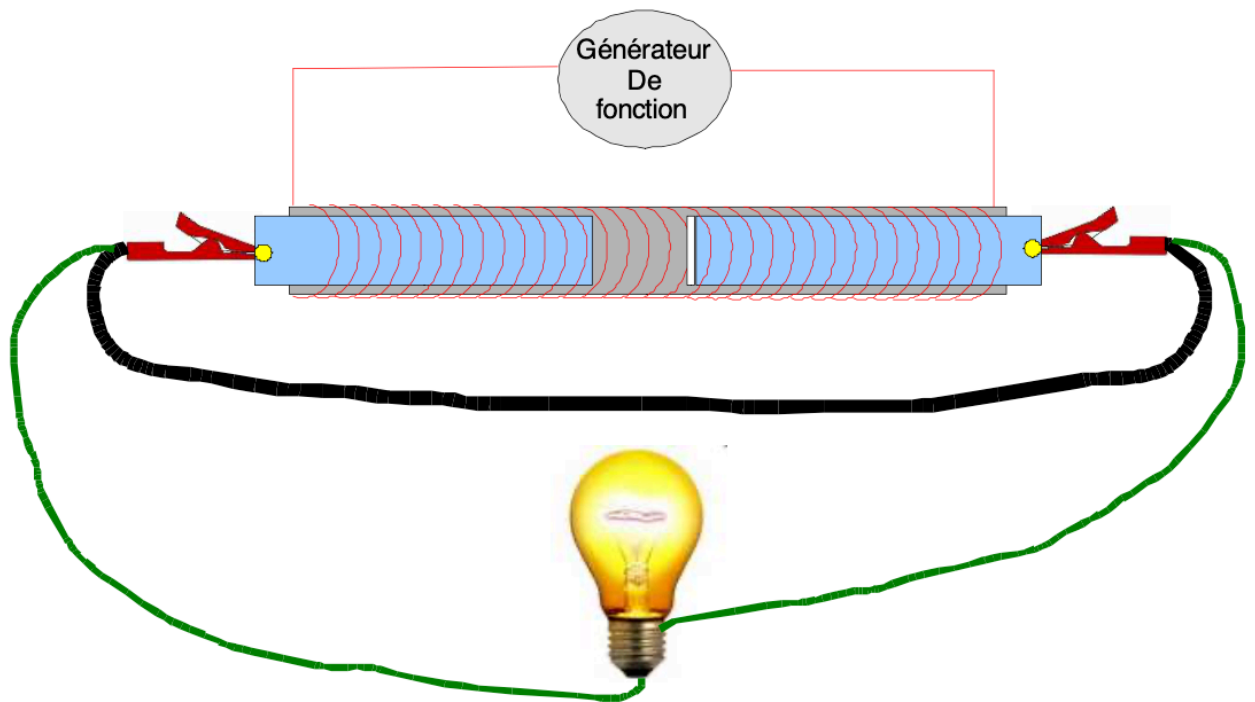
The impedance load Z_{ch} is the bulb (resistive + inductive leakage by the spiral filament)

Here is the diagram:



Equivalent electric diagram connection:

(Grey bubble below says "Function generator")

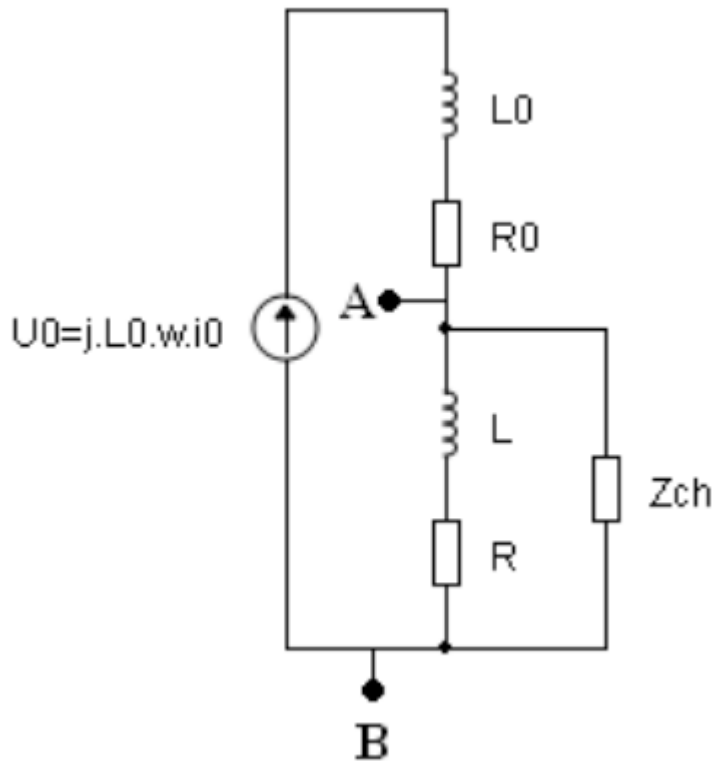


If we look at what is happening numerically, R_0 is small compared to the impedance of the inductance coil L_0 so we can, for simplicity, consider that R_0 does not exist. This is always what Richard VIALLE does in his schematics. However, we must restore R_0 if we create a compensation circuit for L_0 and L by tuning with a capacitor (which is done in what is called output tuning)

Similarly, in the branch containing L and R , numerically we can see that R is small compared to the impedance of the inductance coil L and we can simplify by considering that R does not exist. Same remark for the restoration of R if we create an output tuning.

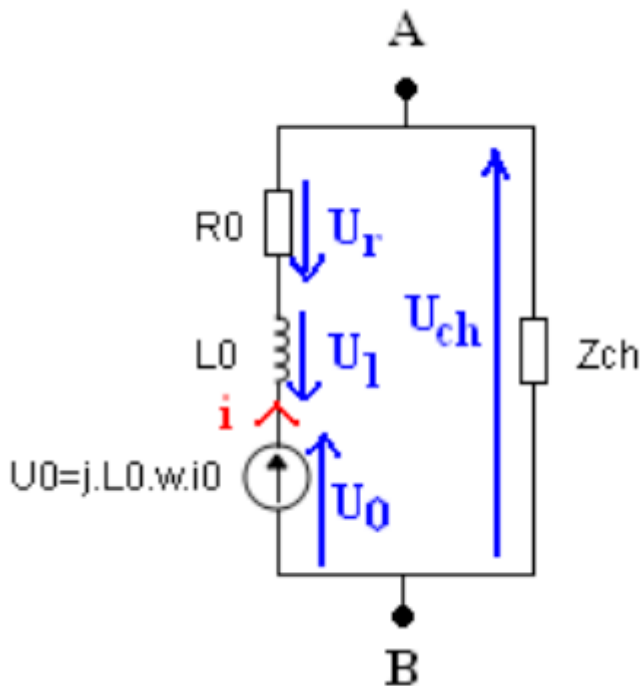
Let's keep all these elements for the most complete calculation possible.

We can already redraw the diagram in a more practical form allowing us to see the voltage divider bridge.



What is the point of using the short-circuit wire?

Let's see what happens without this short-circuit to answer the question. We take the diagram that we annotate, the one without the short-circuit first:



The charge being a light bulb, it has a resistive part R_{ch} and an inductive part L_{ch} : $Z_{ch} = R_{ch} + j.L_{ch}.\omega$

For a 4v/40mA bulb like those used in the experiments, I was able to measure with an ohmmeter: $R_{ch}=12.4$ ohms cold (and 100 ohms hot, the resistance of the filament increases with the temperature)

$L_{ch}<150$ nH estimated by indirect measurements (the measurement with the LC meter is false because of the resistance)

$$U_{ch}=U_0-U_l-U_r = j.L_0.\omega.i_0-j.L_0.\omega.i-R_0.i \quad U_{ch}=R_{ch}.i+j.L_{ch}.\omega.i$$

Therefore: $j.L_0.\omega.i_0-j.L_0.\omega.i-R_0.i=R_{ch}.i+j.L_{ch}.\omega.i$ Or:

$$i = \frac{j.L_0.\omega.i_0}{R_0 + R_{ch} + j.(L_0 + L_{ch}).\omega}$$

The complex power across the load (bulb) is:

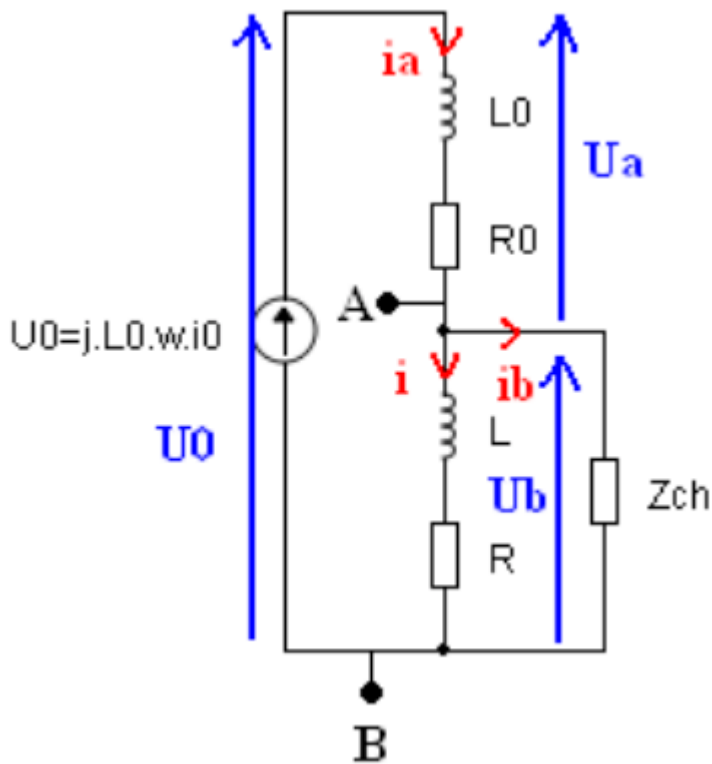
$$P = U_{ch}.\bar{i} = (R_{ch} + j.L_{ch}.\omega)i.\bar{i} = (R_{ch} + j.L_{ch}.\omega)|i|^2$$

Donc la puissance active dans l'ampoule s'écrit :

$$P_{active1} = R_{ch}|i|^2 = \frac{R_{ch}.L_0^2.\omega^2.i_0^2}{(R_0+R_{ch})^2+(L_0+L_{ch})^2.\omega^2}$$

Now we look at what we get with the short-circuit wire:

We take the diagram with short-circuit, which we annotate:



By doing the same, the complex power at the terminals of the load (light bulb is):

$$P = U_b \cdot \bar{i}_b = (R_{ch} + j \cdot L_{ch} \cdot \omega) i_b \cdot \bar{i}_b = (R_{ch} + j \cdot L_{ch} \cdot \omega) |i_b|^2$$

So the active power in the light bulb is written:

$$P_{active} = R_{ch} |i_b|^2$$

And after some calculations that take a long time to write here, by writing the laws of meshes and nodes, we arrive at

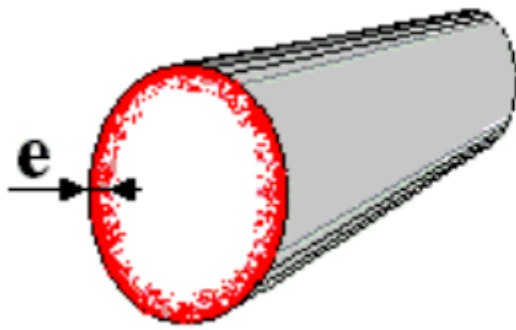
$$P_{active2} = \frac{R_{ch} \cdot L_0^2 \cdot \omega^2 \cdot i_0^2 (R^2 + L^2 \omega^2)}{(RR_0 + RR_{ch} + R_0 R_{ch} - (LL_0 + LL_{ch} + L_0 L_{ch}) \omega^2)^2 + (RL_0 + RL_{ch} + R_{ch} L_0 + R_{ch} L + R_0 L + R_0 L_{ch})^2 \cdot \omega^2}$$

to compare with the wireless short-circuit case which gives:

$$P_{active1} = \frac{R_{ch} \cdot L_0^2 \cdot \omega^2 \cdot i_0^2}{(R_0 + R_{ch})^2 + (L_0 + L_{ch})^2 \cdot \omega^2}$$

Calculating the skin resistance gives:

Skin thickness given in meters:



$$e = \frac{1}{\sqrt{\frac{\pi \cdot \mu_0 \mu_r \cdot f}{\rho}}}$$

We will calculate the skin thickness in mm:

$$e = \frac{10^3}{2\pi \sqrt{\frac{10^{-7} \cdot f}{\rho}}} \text{ mm}$$

(Which is a different re-write of the above equation.)

with $\rho = 1.7 \cdot 10^{-8} \Omega \cdot \text{m}$ the resistivity of copper and f : frequency of the alternating current in Hertz

Then we calculate the effective resistance taking into account the skin effect (this is the total resistance of the material; skin effect included) by:

$$R = R_c \frac{r^2}{e(2r-e)} \Omega$$

where r is given in mm if we have a solid wire of circular diameter of radius r and e given in mm by the previous formula.

With the continuous resistance (without the skin effect) given by a conductor:

$$R_c = \rho \frac{L}{S}$$

Where L =Length in meters of the conductor and S : section in m^2 of the conductor

Or more generally but in an approximate manner:

$$R \approx \rho \frac{L}{P \cdot e} \Omega$$

with P : total perimeter in mm of the section of the bar (if hollow material add the perimeter of the inner edge to that of the outer edge, it is the perimeter of the entire section of the bar delimited by the ambient air) and e given previously in mm.

So we calculate that a short-circuit wire 1.21m long and 1mm in diameter has a resistance of $R_c = 0.024 \Omega$ (we remove 2 x 4.7cm of banana plug)

Note:

At the frequency of $f=3.6\text{MHz}$ this gives a skin resistance of: $R=0.18\ \Omega$

Richard VIALLE often takes the value $R=0.15\ \Omega$ in his interview because it is the skin resistance that corresponds to a wire with a length of 1 meter (he considers a wire of 1 meter and not 1.11m as measured more precisely)

Here we are at $f=25\text{MHz}$ and we then have $R=0.46\ \Omega$ for the short-circuit wire of 1.116m.

Doing the same for the bar we obtain $R_0=0.008\ \Omega$ (which is very low because we have a bar with a very large section and therefore very low resistance)

Leakage inductance:

An online calculator provides the means to calculate leakage inductances. It is based on the following formula (L is given in nano Henrys with this equation):

$$x = \sqrt{1 + (d / 2l)^2}$$
$$L = 2l \left[\ln \left[(2l / d) (1 + x) \right] - x + \mu/4 + d / 2l \right]$$

l: length of the wire in cm; d: diameter of the wire in cm; μ : relative magnetic permeability of the wire usually noted μ_r ($\mu_r = 1$ if non-magnetic)

x is only an intermediate calculation parameter

See calculator here:

<http://www.consultrsr.com/resources/eis/induct5.htm>

We then obtain $L = 1.71$ micro Henry for the leakage inductance of the short-circuit wire of 1.116m

Note 1:

At the frequency of 3.6MHz this gives a leakage impedance of $34\ \Omega$ over 1 meter, which Richard VIALLE talks about in the interview. Here we work at 25MHz, which changes the value.

We also obtain: $L_0 = 370$ nano Henry for a bar with a section of $1\text{cm} \times 3\text{cm}$ and 48cm long (we roughly adapt the formula by saying that we have a round bar with a radius of 9.77mm which comes back to the same section of 3cm^2)

We can also find other simpler formulas (less good approximation), correct up to VHF frequencies:

$$L = 0.2l \left(\ln \frac{4l}{d} - \frac{3}{4} \right)$$

with: L given in μH , with l: length in mm and d: diameter in mm
 See: <http://www.rfcafe.com/references/electrical/inductance.htm>

Or more complex formulas, with better approximation, accurate to a few percent:

$$L = 0.002 \times l \left[\ln \left(\frac{4.0 \times l}{d} \right) - 1.0 + \frac{d}{2.0 \times l} + \frac{\mu_r T(x)}{4.0} \right] (\mu\text{H})$$

$$T(x) \approx \sqrt{\frac{0.873011 + 0.00186128x}{1.0 - 0.278381x + 0.127964x^2}} \quad x = 2.0 \pi r \sqrt{\frac{2.0 \mu f}{\sigma}}$$

r: radius in cm; d: diameter in cm; l: length in cm; f: frequency in Hz; μ is here the total permeability ($=\mu_r \times 4\pi \cdot 10^{-7}$)

See: <http://chemandy.com/calculators/round-wire-inductance-calculator.htm>

Since these formulas remain an approximation anyway, we will use the order of magnitude of the result given by the first 2 significant digits.

Balance of the numerical values and numerical calculation of the active powers:

$R_0 = 0.008 \Omega$

$R = 0.46 \Omega$

$R_{ch} = 100 \Omega$ under load (hot filament)

$L_0 = 370 \text{ nH}$

$L = 1.71 \mu\text{H}$

$L_{ch} < 150 \text{ nH}$ (which we take as the calculation value)

We can now calculate the powers.

$$P_{active2} = \frac{R_{ch} \cdot L_0^2 \cdot \omega^2 \cdot i_0^2 (R^2 + L^2 \omega^2)}{(RR_0 + RR_{ch} + R_0 R_{ch} - (LL_0 + LL_{ch} + L_0 L_{ch}) \omega^2)^2 + (RL_0 + RL_{ch} + R_{ch} L_0 + R_{ch} L + R_0 L + R_0 L_{ch})^2 \cdot \omega^2}$$

$$P_{active2} = 13,8 \cdot i_0^2$$

$$P_{active1} = \frac{R_{ch} \cdot L_0^2 \cdot \omega^2 \cdot i_0^2}{(R_0 + R_{ch})^2 + (L_0 + L_{ch})^2 \cdot \omega^2}$$

$$P_{active1} = 20,3 \cdot i_0^2$$

So there seems to be a big problem: the power obtained without the wire is calculated to be greater than that obtained with the wire. However, experience shows the opposite: we have more active power output with the wire than without the wire.

Note:

As we are not working on the overunity frequency but a harmonic frequency (harmonic 5 as we have seen) the current i_0 which flows through the generator is much lower than what we are entitled to expect (less resonance of the electrons). Indeed we come out of the order of 0.16W at the output with the wire connected, so we have a cold current of the order of 250 mA.

At the adapted resonance frequency we would have a much larger cold current, but also a reduction in the active power by this calculation because the pulsation ω becomes much smaller.

We would have a very small current i_0 here anyway because the input inductance estimated at 300 turns of two wires of 0.5mm diameter in parallel (equivalent to 1 wire of diameter 0.71mm) wound on 48cm long with an equivalent diameter of 1.95cm (1cmx3cm rectangular) gives in order of magnitude of estimation an inductance of $L=10^{-4}$ H

This gives an input impedance of $L\omega=15\ 700\Omega$ approximately. Under 4V effective we therefore have a current in the winding of the order of 0.25mA which is ridiculous and corresponds to an extremely weak magnetization. We understand why the overunity effect (which was nevertheless there) gives a very small cold current output.

Explanations on the coherence of the output powers in both cases:

This is where the last element of Richard VIALLE's theory concerning his observations of overunity and in particular the return of the output to the input comes into play!

Indeed, we have not yet spoken about it, because it is something that he did in the 2nd version of the autogenerator, Richard VIALLE was able to observe that energy was going back to the power supply input of the winding.

This made it possible to design a battery-powered device that recharged the battery used to power the control electronics even while the autogenerator was discharging. He was able to achieve a loop with this process and ultimately prove that any calculation apart from the system worked alone (for weeks and months) autonomously.

We will come back to this later, in the following document on this 2nd autogenerator. When the short-circuit wire is in place, and no bulb is placed, we have a "load" made up of the short-circuit wire alone; which has a very low impedance. It therefore allows a greater current to exit the circuit (more than with the bulb alone).

This current of free electrons circulates in the bar, so it produces a magnetic induction in this bar.

We have an additional magnetic field that is created, which will increase the cold current produced by the Richard VIALLE effect (more magnetization, more cold current).

So when we have put the wire, we have more current i_0 that comes out.

The formula for calculating the power therefore becomes, with the short-circuit wire:

Richard VIALLE writes that in this case the new cold current is of the type:

$i'_0 = k \cdot i_0$ where i is the TOTAL current that passes through the external circuit and therefore passes through the bar as well, which creates an additional cold current by

induction of an additional magnetic field. k depends on the external current that comes out of the bar, therefore on the assembly.

Therefore the power calculations are modified as follows, if we calculate numerically:

Without the short-circuit:

$$i=0,20.i_0 ; P_{active1} = 20,3.i'_0{}^2 = 20,3.k^2.i_0{}^2$$

With the short-circuit:

The current in the resistor is only $0.16.i_0$ but i in the entire circuit is $0,32.i_0$

$$i=0,32.i_0 ; P_{active2} = 13,8.i'_0{}^2 = 13,8.k'^2.i_0{}^2$$

We can thus explain that $P_{active2} > P_{active1}$ with this consideration if k is large enough. The value of k remains to be determined exactly to know what it is.

Estimates (nothing precise) on the voltage measurements and the current calculations have made it possible to roughly evaluate that by taking $k=1$ in the wireless case we then have $k'=10$ in the wired case.

We therefore arrive at:

$$P_{active1} = 20,3.i_0{}^2 \text{ (sans fil) et } P_{active2} = 138.i_0{}^2 \text{ (with wire)}$$

Thus if we have the nominal power in the bulb with the wire, i.e. 160mW, we then have only 24mW in the bulb without the wire, which therefore hardly lights up. The estimates of k were made to write this document with rough values of the voltages from memory; the assembly would have to be redone to calculate what it is precisely.

But it allows us to understand what is happening in depth.

The short-circuit wire is therefore a way of making external current flow which amplifies the overunity effect which is then available at the output. Indeed, the bulb alone makes a much smaller current flow than the bulb placed in parallel with the wire. Of course, the wire swallows up part of the overunity current, but it is multiplied so much that the remaining part for the bulb is much greater than it was without it.

This is a crude method, only a first draft; without any adjustment to amplify the output effect by adjusting the output (which acts as feedback on the input, feedback effect shall we say).

Then Richard VIALLE had the idea of making this short-circuit by eliminating all the impedance of the outgoing circuit. As this impedance is reactive of the inductive type, he added a capacitor in the output branch. And since the adjustable capacitor used gives quite large capacitive reactive impedances, the compensation is too strong, so he also used an additional inductor in the output, to increase the inductive type

reactive impedance. This is how he achieved the output tuning. We will come back to this in the other part, on the 2nd autogenerator.

It is not said that all electrical theory should not be questioned; as already said, the model given is an attempt at understanding carried out by Richard VIALLE.

The overunity effect is there, the output power is there; but how exactly it works remains uncertain, and at the risk of repeating ourselves, that is why it is in the field of RESEARCH!

MORE to come... Richard VIALLE's U-shaped autogenerator: 2nd autogenerator, with and without loop system

(Translation of second part of this document will be provided once the translation is complete)