US patent n°4,936,961 - Demonstration from paperwork

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Equation 1 : $\boxed{Z_{series} = (X_C - X_L)}$

Equation 2 : $\boxed{X_c = \frac{1}{2 * \pi * f_C}}$

Equation 3 : $\boxed{X_L = 2 * \pi * f_L}$

Equation 4 : $\boxed{F = \frac{1}{2 * \pi * \sqrt{L * C}}}$ where F is the resonance frequency of the LC circuit.

Equation 5 : Ohm's law for the LC circuit in series is given by $\boxed{V_t = I * Z_{series}}$

Equation 6 : The voltage $\boxed{(V_L)}$ across the inductor (L) is given by the equation : $\boxed{V_L = V_t * \frac{X_L}{(X_L - X_C)}}$

Equation 7 : The voltage $\boxed{(V_C)}$ across the capacitor (C) is given by the equation : $\boxed{V_C = V_t * \frac{X_C}{(X_L - X_C)}}$

Equation 8 : $\boxed{Z = \sqrt{R_L^2 + (X_L - X_C)^2}}$

Equation 9 : $\boxed{Z = \sqrt{R_L + Z_2 + Z_3 + R_E}}$ where $\boxed{R_E}$ is the dielectric constant of natural water.

Equation 10 : Ohm's law as to applied electrical power which is $\boxed{E = I * R}$

Equation 11 : $\boxed{P = E * I}$

Equation 12 : $\boxed{A = \frac{F}{M}}$ is Newton's law where the acceleration (A) of a particle mass (M) acted on by a net force (F) whereby net force (F) is the force from the Coulomb's law

Equation 13 : the Coulomb's law is $\boxed{F = \frac{q * q'}{R^2}}$

Equation 14 : $\boxed{V = \frac{q}{e^R} or V = \frac{q}{e * R}}$

Equation 15 : $\boxed{R_S = (V_{in} - V_{led})/I_{led}}$

Equation 16 : $\boxed{P_W = V_{cc} * I_t}$(LED circuit in parallel array)

Equation 17 : $\boxed{L_e = \sqrt{\frac{Ion^2 * T_1}{(T_1 + T_2)}}}$

Voltage intensifier circuit (AA) : figure 1-1

Questions
$\boxed{R_2 =?}$
$\boxed{R_3 =?}$
Number of turns of (G) = ?
Number of turns of (A) = ?
$\boxed{R_1 =?}$
Number of turns of (C) = ?
Number of turns of (D) = ?

Figure 1-2 : LC circuit

Figure 1-3 : applied voltage to plates

Figure 1-4 : applied voltage to resonant cavity

Figure 1-5 : Variable amplitude gated unipolar pulse frequency dynamically controls hydrogen gas yield on demand while inhibiting amp flow

Figure 1-6 : Voltage potential performing work

Figure 1-7 : Electrical charges of the water molecule

Figure 1-8 : Hydrogen fracturing process

Figure 1-9 : Electrical polarization process

Voltage intensifier circuit (AA) : Figure 1-1

Démonstration :

$\boxed{U_{C1} = 1000V}$

$\boxed{U_{L1} = 10V}$

$\boxed{f_1 = 10kHz}$

$\boxed{i_1 = 500mA}$

Onde sinusoïdale et duty cycle = 50%.

$$\boxed{C = \frac{Q}{U}}$$

$$\boxed{L = \frac{N^2 * \mu * A}{l}}$$

$$\boxed{U_L(t) = +L * \frac{\mathrm{d}}{\mathrm{d}t}\left(i_L(t)\right)}$$

$$\boxed{i_C(t) = C * \frac{\mathrm{d}}{\mathrm{d}t}\left(U_C(t)\right)}$$

$$\boxed{U_L(t) = R_L * i_L(t) + L * \frac{\mathrm{d}}{\mathrm{d}t}\left(i_L(t)\right)}$$

$$\boxed{m = \frac{\underline{U_2}}{\underline{U_1}} = \frac{N_2}{N_1} = \frac{I_1}{I_2}}$$

$$\boxed{f = \frac{1}{T}}$$

$$\boxed{\omega = 2 * \pi * f}$$

$\boxed{D = \frac{PW}{T}}$ where D : duty cycle ; PW : pulse width ; T : total period of the signal

$$\boxed{\underline{Z_L} = R_L + j * L * \omega}$$

$$\boxed{\underline{Z_C} = \frac{1}{j * C * \omega}}$$

Schéma impédance :

D'après la loi des mailles, on a :

$$\boxed{\begin{aligned}
(1) : \underline{U_{L_{1bis}}} &= \underline{Z_2} * \underline{i_2} + \underline{U_{C_1}} + \underline{Z_3} * \underline{i_2} \\
&= (R_{L_2} + j * L_2 * \omega) * \underline{i_2} + \frac{1}{j * C_1 * \omega} * \underline{i_2} + (R_{L_3} + j * L_3 * \omega) * \underline{i_2} \\
&= \underline{i_2} * (R_{L_2} + j * L_2 * \omega + \frac{1}{j * C_1 * \omega} + R_{L_3} + j * L_3 * \omega) \\
&= \underline{i_2} * \frac{1 + j * C_1 * \omega * (R_{L_2} + j * L_2 * \omega + R_{L_3} + j * L_3 * \omega)}{j * C_1 * \omega}
\end{aligned}}$$

$$\boxed{(2) : \underline{U_{C_1}} = \underline{Z_{C_1}} * \underline{i_2}}$$

$$\boxed{\begin{aligned}(2) \iff \mid \underline{i_2} \mid &= \frac{\mid \underline{U_{C_1}} \mid}{\mid \underline{Z_{C_1}} \mid} \\ &= \frac{\mid \underline{U_{C_1}} \mid}{\frac{|1|}{|j*C_1*\omega|}} \\ &= \mid \underline{U_{C_1}} \mid * \mid j * C_1 * \omega \mid \\ &= 1000 * \sqrt{(C_1 * \omega)^2} \\ &= 1000 * C_1 * \omega\end{aligned}}$$

$$\boxed{\begin{aligned}(1) \iff \underline{U_{L_{1bis}}} &= \underline{i_2}.\frac{(1 + j.R_{L_2}.C_1.\omega - L_2.C_1.\omega^2 + j.R_{L_3}.C_1.\omega - L_3.C_1.\omega^2)}{(j.C_1.\omega)} \\ &= \underline{i_2}.\frac{[(1 - L_2.C_1.\omega^2 - L_3.C_1.\omega^2) + j.(R_{L_2}.C_1.\omega + R_{L_3}.C_1.\omega)]}{(j.C_1.\omega)}\end{aligned}}$$

$$\boxed{\begin{aligned}(3) : \mid \underline{U_{L_{1bis}}} \mid &= \mid \underline{i_2} \mid . \frac{\mid [(1 - L_2.C_1.\omega^2 - L_3.C_1.\omega^2) + j.(R_{L_2}.C_1.\omega + R_{L_3}.C_1.\omega)] \mid}{\mid (j.C_1.\omega) \mid} \\ &= 1000.C_1.\omega.\frac{\sqrt{(1 - L_2.C_1.\omega^2 - L_3.C_1.\omega^2)^2 + (R_{L_2}.C_1.\omega + R_{L_3}.C_1.\omega)^2}}{(C_1.\omega)} \\ &= 1000.\sqrt{(1 - L_2.C_1.\omega^2 - L_3.C_1.\omega^2)^2 + (R_{L_2}.C_1.\omega + R_{L_3}.C_1.\omega)^2} \\ &= 1000.\sqrt{(1 - C_1.\omega^2.(L_2 + L_3))^2 + (C_1.\omega.(R_{L_2} + R_{L_3}))^2}\end{aligned}}$$

Or, $\boxed{\mid \underline{U_{L_{1bis}}} \mid = 78}$

$$\boxed{\begin{aligned}(3) &\iff 1000.\sqrt{(1 - C_1.\omega^2.(L_2 + L_3))^2 + (C_1.\omega.(R_{L_2} + R_{L_3}))^2} = 78 \\ &\iff \sqrt{(1 - C_1.\omega^2.(L_2 + L_3))^2 + (C_1.\omega.(R_{L_2} + R_{L_3}))^2} = \frac{78}{1000} \\ &\iff (1 - C_1.\omega^2.(L_2 + L_3))^2 + (C_1.\omega.(R_{L_2} + R_{L_3}))^2 = (\frac{78}{1000})^2 \\ &\iff (1 - C_1.(2.\pi.10^4)^2.(L_2 + L_3))^2 + (C_1.2.\pi.10^4.(R_{L_2} + R_{L_3}))^2 = (\frac{78}{1000})^2\end{aligned}}$$

Or,

$$\boxed{\frac{\mid \underline{U_{L_{1bis}}} \mid}{\mid \underline{U_{L_1}} \mid} = \frac{78}{26} = 3}$$

Or,

$$\boxed{\begin{aligned} \frac{\mid \underline{I_1} \mid}{\mid \underline{I_2} \mid} = 3 &\iff \frac{500.10^{-3}}{\mid \underline{I_2} \mid} = 3 \\ \iff \mid \underline{I_2} \mid = \frac{500.10^{-3}}{3} &= 166,67.10^{-3} \\ &\iff \mid \underline{I_2} \mid = 1000.C_1.\omega \\ &\iff C_1 = \frac{\mid \underline{I_2} \mid}{1000.2.\pi.10^4} \\ &\iff C_1 = \frac{166,67.10^{-3}}{10^7.2.\pi} \\ &\iff C_1 = 2,7 * 10^{-9} \end{aligned}}$$

Or,

$$\boxed{N_{L_1} = 200}$$

$$\boxed{N_{L_{1bis}} = 600}$$

Or,

$$\boxed{(3) \iff (1 - 4.10^{-11}.(2.\pi.10^4)^2.(L_2 + L_3)^2)^2 + (4.10^{-11}.2.\pi.10^4.(R_{L_2} + R_{L_3})^2 = 0,006084}$$

D'après la loi des mailles dans la maille (a) en impédance complexe, on a :

$$\boxed{\begin{aligned} (4) &\iff \underline{U_{L_{1bis}}} = \underline{U_{C_1}} + \underline{U_{L_2,R_2}} + \underline{U_{L_3,R_3}} \\ &\iff \underline{U_{L_{1bis}}} - \underline{U_{C_1}} = \underline{U_{L_2,R_2}} + \underline{U_{L_3,R_3}} \\ &\iff \mid \underline{U_{L_{1bis}}} - \underline{U_{C_1}} \mid = \mid \underline{U_{L_2,R_2}} + \underline{U_{L_3,R_3}} \mid \\ &\iff \mid \underline{U_{L_{1bis}}} - \underline{U_{C_1}} \mid \leq \mid \underline{U_{L_{1bis}}} \mid - \mid \underline{U_{C_1}} \mid \end{aligned}}$$

Demonstrate that the rise in voltage, the rise in frequency, the lowering of the current greatly influence the functioning of water electrolysis.

Chemical formula for water electrolysis :
Cathode :

$$\boxed{2\,H^+ + 2\,e^- \longrightarrow H_{2(g)}}$$

Anode :

$$\boxed{2\,H_2O_{(l)} \longrightarrow O_{2(g)} + 4\,H_{(aq)}{}^{+} + 4\,e^{-}}$$

Final reaction :

$$\boxed{2\,H_2O_{(l)} \longrightarrow O_{2(g)} + H_{2(g)}}$$

We have :

$$\boxed{\begin{aligned} i_{C_1} &= 166,67 \\ f &= 10 \end{aligned}}$$

$\boxed{i_{C_1}}$ is in mA and f in kHz
Let $\boxed{V_{water}}$ be the volume of water used for the electrolysis reaction in m^3.
Let $\boxed{\rho_{water}}$ be the density of water in $\frac{kg}{m^3}$.
Let $\boxed{n_{water}}$ be the amount of water matter or the molar mass of water in mol.
Let $\boxed{C_{water}}$ be the water concentration in $\frac{mol}{m^3}$.
Let $\boxed{q_{water}}$ be the amount of electrons from the electrolysis of water in coulombs.
Let $\boxed{f_{water}}$ be the resonant frequency of water in Hz.
Let $\boxed{E_{v_{water}}}$ be the magnitude of vibration or excitation of water in joules.
Let $\boxed{V_{H_{2(g)}}}$ be the volume of dihydrogen produced during the reaction of the electrolysis of water in cubic meter.
Let $\boxed{V_{O_{2(g)}}}$ be the volume of dioxygen produced during the reaction of the electrolysis of water in cubic meter.
It is considered that the radiolysis of water comes into play during the supply of intense radiant energy with the use of LEDs. We speak of a break in the water molecule by electronic excitation during the ionization phenomenon.
We have : $\boxed{V_{H_{2(g)}} = 2.V_{O_{2(g)}}}$
How does electronic electron excitation work? By photons. How to excite an electron? It is necessary to bring photons to excite the electron thanks to lasers or leds, for example. How the excitation levels, vibration levels and rotation levels of the water molecule are influenced with the following parameters: 1) increase in the frequency of the electronic current greater than or equal to 10 kHz. 2) increase in the voltage across the electrolyser greater than or equal to 1000 V. 3) Energy supply in photonic form using LEDs or lasers. 4) Decrease in the intensity of the electric current less than or equal to 166.67 mA.
Let $\boxed{E_{vib_{water}}}$ be the vibrational energy of water in joules.
Let $\boxed{E_{excwater}}$ be the energy brought by a photon to the water molecule in joules.
Diagram of energy levels of the water molecule

What is the resonance frequency of the water molecule? The phenomenon of resonance is nothing other than this effect of accumulation of energy by injecting it at the moment when it can be added to the energy already accumulated, that is to say, in phase with the latter.

$\boxed{E_{daf} + E_{if} = E_{rf}}$ où f est the resonant frequency.

The excitation levels, the vibration levels and the rotation levels of the water molecule are influenced by: * the increase in the frequency of the alternating electric current greater than or equal to 10 kHz because this increases the resonance phenomenon which accumulates a lot of energy in the electrolyser cell which will contribute to the ionization energy. * the increase in the voltage across the electrolyser cell greater than or equal to 1000 V because the cell behaves like a cylindrical capacitor and the charge supplied to the cell is proportional to the electric voltage supplied to the cell electrolyser and its capacity. So, the higher the voltage, the greater the charge supplied and there will be many more electrons at play. * Leds and lasers bring energy to the cell of the electrolyser thanks to the photons which will excite the water molecule and the electrons so that they change their atomic orbits until the electrons are released and create the decomposition of water. * the decrease in the intensity of the electric current less than or equal to 166.67 mA is compensated by the extreme rise in the electric voltage at the level of the electrolyser cell (Q = i. t = C. U)

Let $\boxed{i}$ be the electric current supplied to the cell in amperes.

Let $\boxed{U}$ be the electric voltage supplied to the cell in volts.

Let $\boxed{Q}$ be the charge supplied to the cell in coulombs.

Let $\boxed{C}$ be the capacity to the cell in farads.

Knowing that the cell is a cylindrical capacitor composed of cylindrical stainless steel tubes.

Let $\boxed{D_1}$ be the outside diameter of the outer tube of the cell, the value of which is 1,905 cm.

Let $\boxed{D_2}$ be the outside diameter of the inside tube of the cell, the value of which is 1,27 cm.

Let $\boxed{h}$ be the height of the two cell tubes, the value of which is 10.16 cm

We have :

$$\boxed{C = \frac{2 * \pi * \epsilon_{water} * h}{\log_e \frac{R_2}{R_1}}}$$

$$\boxed{\begin{cases} R_1 = 6,35 * 10^{-3} \\ R_2 = 9,525 * 10^{-3} \\ h = 0,1016 \\ \epsilon_r = 80,2 \\ \epsilon_{water} = 7 * 10^{-10} \\ \epsilon_{vacuum} = 8,8541878128 * 10^{-12} \\ C = 1,10209271 * 10^{-9} \end{cases}}$$

$\boxed{h}$ is the length of the cylinders in meter ; $\boxed{R_1}$ is the outside radius of the inner cylinder in meter ; $\boxed{R_2}$ is the outside radius of the outside cylinder in meter ; $\boxed{\epsilon_{vacuum}}$ is the vacuum permittivity in farad per meter ; $\boxed{\epsilon_r}$ is the relative permittivity of the water without unit ; $\boxed{\epsilon_{water}}$ is the water permittivity ; $\boxed{C}$ is the capacitance of the capacitor included in the water bath in farad
Calculate Q knowing that U = 1000 V.We have :

$$\boxed{\begin{cases} Q & = C.U \\ & = 1,10209271.10^{-9}.10^3 \\ & = 1,10209271.10^{-6} \end{cases}}$$

Q is in coulombs.
Calculate the number of moles of electrons in the cell in mol.
We have : $\boxed{Q = n_{e^-}.F}$ where F is the Faraday constant = 96500 coulombs per mol
We have :

$$\boxed{\begin{cases} n_{e^-} & = \frac{Q}{F} \\ & = \frac{1,10209271.10^{-6}}{96500} \\ & = 1,14206498.10^{-11} \end{cases}}$$

Calculate the number of electrons in the cell.
According to Avogadro's law, we have : $\boxed{N_i(X) = n_{i(X)}.N_A}$ where $\boxed{N_A}$ is the Avogadro constant whose value is : $\boxed{6,02214076.10^{23}}$ mol^{-1}.
We have :

$$\boxed{\begin{aligned} N(e^-) &= n(e^-).N_A \\ &= 1,14206498.10^{-11}.6,02214076.10^{23} \\ &= 6,9 * 10^{12} \end{aligned}}$$

Hence, the number of electrons in the cell is equal to 6.9 trillion electrons.
We have : $\boxed{f = \dfrac{1}{T} \iff T = \dfrac{1}{f} = \dfrac{1}{10^4} = 10^{-4}}$ where f is in Hz and T is in seconds.
The cell of the electrolyser receives an alternating current, no negative value.

Classic electrolysis :

$$\boxed{\begin{cases} * \quad High \quad direct \quad current \\ * \quad Low \quad electric \quad voltage \\ * \quad No \quad resonance \quad phenomenon \\ * \quad f = 60 \end{cases}}$$

Stanley Meyer electrolysis :

$$\boxed{\begin{cases} * \quad Weak \quad alternating \quad electric \quad current \\ * \quad High \quad AC \quad voltage \\ * \quad Resonance \quad phenomenon \\ * \quad High \quad frequency = 10kHz \\ * \quad Duty \quad cyle = 50 * \quad T_{ON} = 50 * 10^{-6} \end{cases}}$$