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THE NEW LAW OF ELECTRICAL POWER FORMATION

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Announcement. All biological objects of Nature consume electrical energy, which supplies, for example, the heart with the pulses. It is the most economical process of its consumption. All electrical energy sources, which are invented by a man, produce it continuously. The absolute majority of this energy is consumed continuously as well; all devices, which register its consumption, are adjusted to continuous voltage, which is generated by the primary energy sources: power station generators, accumulators and batteries. As a result, such devices distort pulse consumption of electrical energy. An elimination of this distortion is based on the new law of electrical power formation [1], [2], [3], [4], [5], [6], [7], [8].

In SI system, energy is expressed in joules (J) [6]. Electric energy quantity E depends on voltage U, current I and time t of their action and is determined by the dependence

$$E = U \cdot I \cdot tJ\,. \tag{1}$$

It order to know a value of energy being generated per second, the notion “power” has been introduced. It is determined according to the formula (Fig. 1) [6]

. (2)

When voltage and current are continuous (Fig. 1), average power is calculated according to the formula

$$P_{\tilde{N}} = U_{\tilde{N}} \cdot I_{\tilde{N}}\,, \tag{3}$$

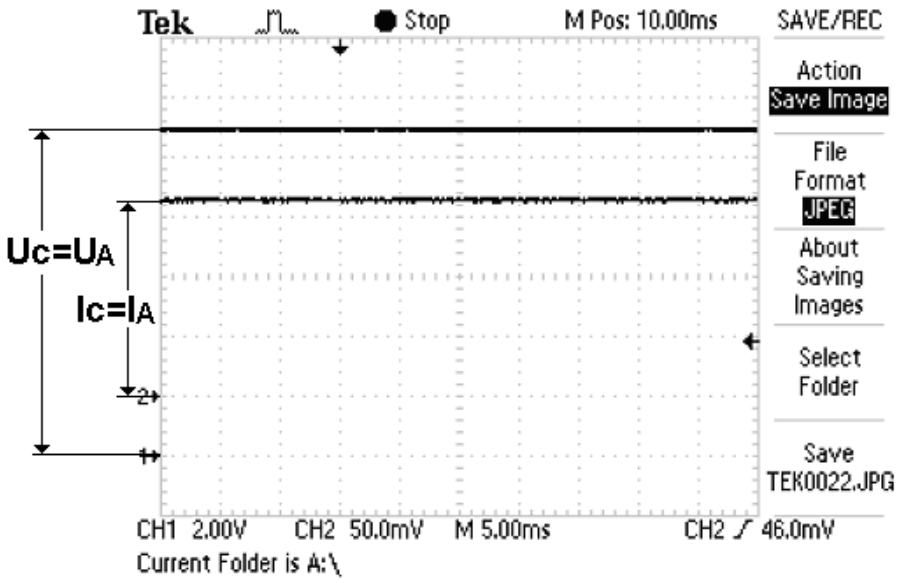


Fig. 1. Oscillogram of voltage and current at the terminals of the accumulator and the lamp

If voltage and current are consumed by pulses with the duration (for example, τ=0.0025 s, Fig. 2), which is considerably less than duration of a second, power, which is determined by the product of the amplitudes of pulses of voltage and current, does not correspond to SI system, which requires their continuous action in the interval of duration of the whole second [4]. In order to make a correspondence of a multiplex result of the pulse values of voltage and current to SI system, it is necessary to prolong the action of voltage and current to the duration of one second (Fig. 2) [6]. In order to carry out this operation, the notion "relative pulse duration" was introduced long ago. If the pulses of voltage and current are rectangular (Fig. 2), their relative pulse duration S is equal to a ratio of pulse repetition period T to pulse duration τ (Fig. 2) [4].

$$S = \frac{T}{\tau}. \tag{4}$$

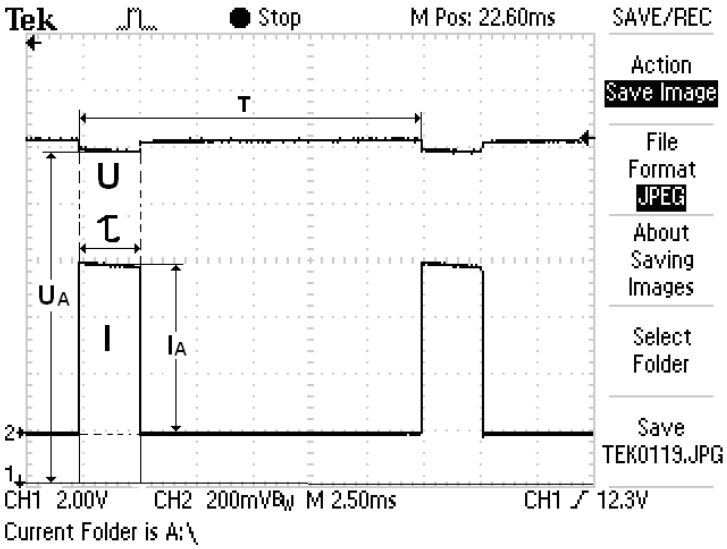


Fig. 2. Oscillogram of accumulator pulse discharge

If the pulses have a complicated form, their relative pulse duration is determined by a ratio of an area of the oscillogram, which is limited by pulse repetition period T horizontally (Fig. 1) and an amplitude of the pulses of voltage U_A or current I_A to an area, which is occupied by these pulses in the above-mentioned limits, vertically. Relative pulse duration of voltage pulses S_U can differ from relative pulse duration of current pulses S_I. Average values of voltage U_C and current I_C, which correspond to notion "watt", are determined according to the formulas:

$$U_C = \frac{U_A}{S_U}; \tag{5}$$

$$I_C = \frac{I_A}{S_I}. \tag{6}$$

It appears from this that average pulse power P_C, which corresponds to notion "watt", is determined according to the formula [1], [2], [3], [4], [5]

$$P_C = U_C \cdot I_C = \frac{U_A \cdot I_A}{S_U \cdot S_I} \Rightarrow \ ...if...S_U = S_I = S..,it..means...P_C = \frac{U_A \cdot I_A}{S^2}. \tag{7}$$

Let us check a physical correspondence of this formula to SI system [6]. Availability of relative pulse duration S_I confirms that a value of current amplitude I_A is prolonged to the value, which corresponds to its continuous action during the whole period T. The current pulses (Fig. 2) with the amplitudes I_A form automatically the voltage pulses with the amplitudes U_A and duration τ, which corresponds to the current pulse duration (Fig. 2). In order to make the above-mentioned voltage pulses correspond to SI system, they should be prolonged to duration of period T as well, i.e. it is necessary to divide the amplitude values of voltage U_A by relative pulse duration of their pulses S_U. The operation being described is reflected in the formula (7). It means that it reflects exactly the physical sense, which is allocated by SI system into notion "watt" (5, 6) [6].
But it has been written in the textbooks on electrical engineering and electrodynamics for more than 100 years that average pulse power is calculated according to the formula (8), which has only relative pulse duration of current pulses S_I only, and nobody has tried to check a correspondence of the physical content of this formula to SI system.

$$P_C = \frac{1}{T}\int_0^T P(t)dt = \frac{1}{T}\int_0^T U(t)dt \cdot I(t)dt \Rightarrow \quad P_C = U_C \cdot \frac{I_A}{S_I}. \tag{8}$$

A check of its correspondence to SI system is stipulated by the necessity to get firm information concerning a correct conversion of electrical energy into other types of energy, for example, into thermal energy [6]. But nobody does it; everybody places confidence in the mathematicians who elaborate electronic programs for the electric measuring devices taking this formula as a base (8).
In order to make this check vivid, let us connect it to the oscillogram, which has been taken from the terminals of the accumulator, to which the lamp consuming energy with the current pulses with the amplitudes I_A and the voltage pulses with the amplitudes U_A (Fig. 2). When a current pulse disappears, voltage at the terminals of the accumulator is restored to the previous value, and it does not take part in the formation of power taken from the accumulator till an appearance of the next current pulse.
The presence of relative pulse duration S_I of current pulses I_A in the formula (8) means that its amplitude value is prolonged to the duration of period T; it corresponds completely to the notion "watt". An absence of relative pulse duration S_U of voltage pulses U_A in the formula (8) means automatically that value U_A has remained non-prolonged to the duration of the whole period T and takes parting the formation of power with its whole value U_A within the whole period; it distorts the final result in the quantity, which is equal to relative pulse duration of voltage pulses S_U. It is a fundamental physical error of the mathematicians, which has remained unnoticed during more than 100 years.
Let us consider Fig. 2. We see that voltage value has taken part in the power formation only within the interval of duration of pulse τ and has not taken part in the interval T-τ; that's why we should prolong the amplitude (U_A) of its duration for the whole interval T-τ. It is done by means of a division of the value U_A by relative pulse duration of pulses. An absence of this operation in the mathematical model (8) makes the value of average power P_C automatically inappropriate to SI system in the quantity, which is equal to relative pulse duration of voltage pulses S_U.

The existing process of electrical energy metering, which based on the mathematical model (8), is random and is in conflict with the notion "watt", which is involved in SI system. It gives a mix of electrical values, not watts. All induction meters ignore a transfer of voltage pulses to a consumer, because an erroneous mathematical model serves as a base of their operation (8) as it does not take into account relative pulse duration S_U of voltage pulses and fails to determine their average value $U_C = U_A / S_U$.
As a proof of authenticity of the new law of electrical power formation (7), let us analyse a power balance of MG-2 motor-generator, which consumes energy from the accumulator by

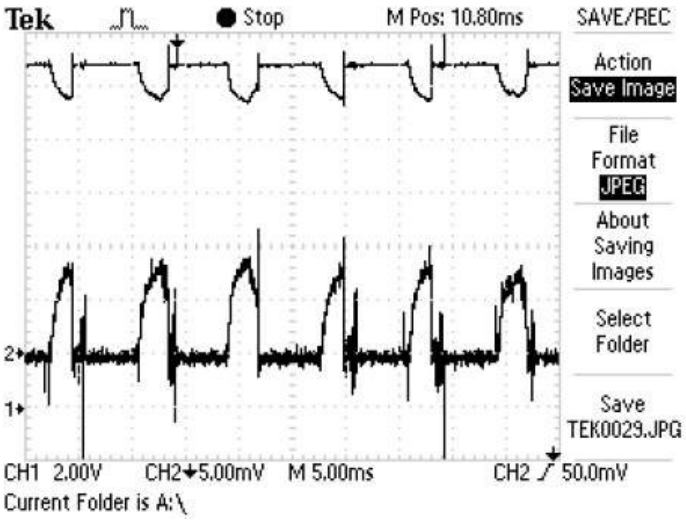
pulses directly, without any intermediate electronic devices (Fig. 3). The rotor plays the role of the motor, and the stator plays the role of the generator.

Fig. 3. MG-2 motor-generator and the motorcycle accumulator for its supply

Let us take an electrolyser cell as a load (Fig. 4), watch the discharge process of 6MTC-9 motorcycle accumulator, which supplies the motor-generator and compare it with the discharge process of the same accumulator, which supplies a set of the lamps with total power, which is equal to power being taken by the motor-generator from the accumulator for its idle run according to the formulae (8) $P_{CC} = U_{CC} \cdot I_C$ =12.60·2.90=36.54 W (Fig. 5) and for water electrolysis.

Fig. 4. Photo of MG-2 +2 6MTC-9 accumulators + the electrolyser cell

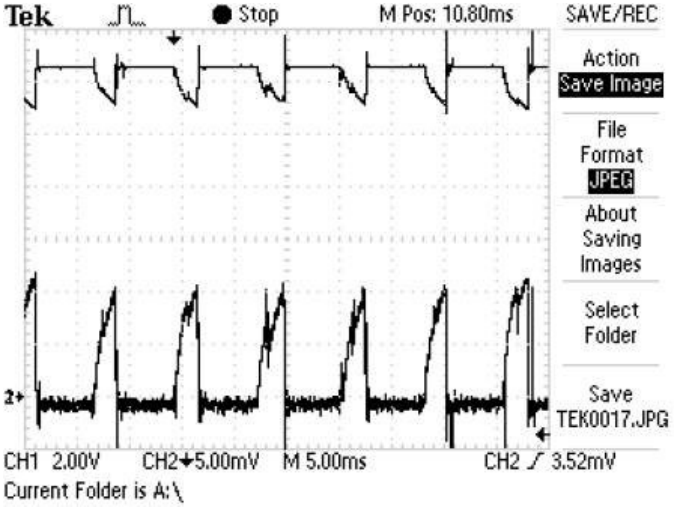
An oscillogram, which is taken from the terminals of MG-2 rotor and the accumulator during the idle run, is given in Fig. 5. MG-2 operated in the mode of the alternate discharge and charge of the accumulators as a self-contained energy source. The oscillograms were made at the 100th minute of the experiment, which lasted for 3 hours 10 minutes. Frequency was 1800 r/min.



MG-2 idle run
Oscillograph reading at the MG-2 rotor terminals:
U_A =12.80 V;
U_{CC} =12.60 V;
I_A =18.00 A;
I_C =2.90 A.
Design data:
S_U =3.67; U_C =11.0/3.67=3.00 V;
$P_{CC} = U_{CC} \cdot I_C$ =12.60·2.90=36.54 W;
$P_C = U_C \cdot I_C$ =3.00·2.90=8.70 W.

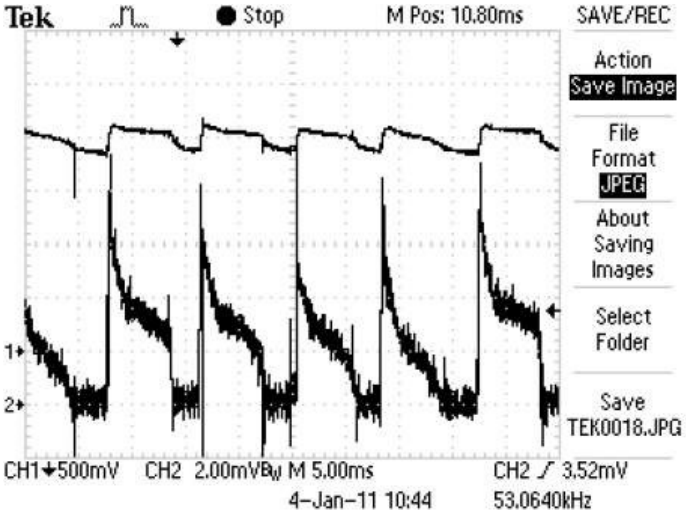
Fig. 5. Oscillogram of the rotor idle run: U_{CC} and U_C are the old value and the new one of average voltage; P_{CC} and P_C are the old value and the new one of average pulse power.

At the rotor - idle run



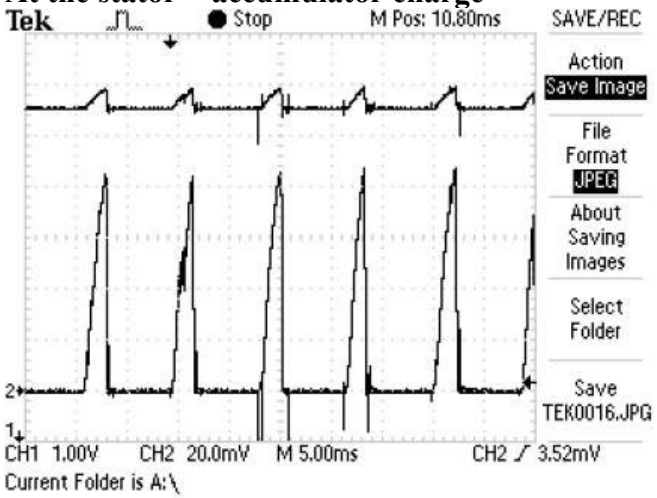
Device current, 2.80 A;
n=1800 r/min
Oscillograph:
U_A =12.60 V;
U_{CC} =12.30 V;
I_A =23.60 A;
I_C =3.08 A;
$P_{CC} = U_{CC} \cdot I_C$ =12.30·3.08=37.88 W;
Design data:
S_U =3.67; U_C =11.0/3.67=3.0 V;
$P_C = U_C \cdot I_C$ =3.00·3.08=9.33 W.

At the stator+1 cell



Oscillograph:
U_A =12.18 V;
U_{CC} =1.99 V;
I_A =9.30 A;
I_C =2.77 A;
$P_{CC} = U_{CC} \cdot I_{C=}$ 1.99·2.77=5.51 W.
Solution consumption -Δm=4.6 g, 8.57 l or 2.7 l/h (O_2 +H_2).
Design data:
S_U =3.67; U_C =0.59 V;
$P_C = U_C \cdot I_C$=0.59·2.77=1.63 W;
P_C (sp.) = 1.63/2.70=0.60 W/l (O_2 +H_2).

At the stator + accumulator charge



Oscillograph:
U_A =6.96 V;
U_{CC} =6.57 V;
I_A =3.87 A;
I_C =0.49 A;
$P_{CC} = U_{CC} \cdot I_C$=6.57·0.49=3.22 W.
Design data:
S_U =4.0; U_C =6.57/4=1.64 V;
$P_C = U_C \cdot I_C$=1.64·0.49=0.80 W.

Fig. 6. Oscillograms of MG-2 electric motor generator at the 100th minute of the experiment

The electronic program of the oscillograph (Figs 5 and 6), which determined the average values of voltage and current is based on the mathematical model (8). On the right of the oscillograms (Figs 5 and 6), the old average values of voltage U_{CC} and current I_C, which have been determined by this program automatically, are given. Average power, which results from these values, is called old power and is designated as $P_{CC} = U_{CC} \cdot I_C$. In order to calculate new power, which designated as $P_C = U_C \cdot I_C$, the value of average voltage U_C has been determined taking into consideration relative pulse duration of its pulses (Fig. 6). The results of the calculations, which originate from the oscillograms (Figs 5 and 6), are given in Table 1.

Table 1. Old average pulse power P_{CC} and new average pulse power P_C at the terminals of MG-2 rotor and stator

Power at the terminals:	Old power, P_{CC} W	New power, P_C W
1. Of the rotor (idle run)	36.54	8.70
2. Rotor (power stroke)	37.88	9.33
3. Stator (self-induction EMF)	5.51	1.63
4. Stator (induction EMF)	3.22	0.80

Total time of the experiment was 3 hours 10 minutes. There were obtained 8.57 litres of H_2+O_2.

Table 2. Voltage drop at the accumulator terminals during 3 hours 10 minutes.

Numbers of the accumulators	**Initial voltage at the accumulator terminals, V**	**Final voltage at the accumulator terminals, V**
1+2 (discharge)	**12.28**	**12.00**
3+4 (discharge)	**12.33**	**12.00**

The main thing is to prove erroneousness of the old mathematical law (8) of the pulse electrical power and authenticity of the new law (7). According to the old law (8) of the formation of the average value of pulse electrical power at the terminals of MG-2 rotor, which is connected to the accumulator, the old average pulse power is P_{CC} =37,88 W (Fig. 6, the first oscillogram). Each of two pairs of 6 volt accumulators, which were connected in series when electric energy was

supplied by pulses into the rotor excitation winding during 3 hours 10 minutes, reduced voltages at its terminals (Table 2) by 0.10 V/h on average.

Fig. 7. Accumulator discharge by the lamps

Initial voltage at the accumulator terminals, to which the lamps with total power of (21+5+5+5)=36.00 W were connected, was 12.78 V (Fig. 7). When 1 hour 40 minutes passed, it was decreased to 4.86 V, or by 7.92 V. It was 7.92/0.3=26.00fold as much than voltage drop rate at the terminals of the accumulator, which supplied MG-2, without taking into consideration various time of their operation. It is quite enough in order to make a conclusion that the old law of pulse electrical power formation (8) was completely erroneous. Certainly, we disregarded 8.57 l of the mixture of hydrogen and oxygen, which was obtained by means of water electrolysis by electric energy produced by MG-2. It is so to say additional energy. It results from the oscillogram in Fig. 6 that direct expenditure of electric energy for the production of one litre of the mixture of hydrogen and oxygen has been 0.60 watts.
The specialists understand that the new law of electrical power formation proves erroneousness of many theoretical provisions of electrical engineering and electrodynamics. Large work should be done in order to rectify them. The new law of electrical power formation gives unlimited possibilities for an elaboration of the economical generators and consumers of electric energy.

Dear mathematicians,
For how many years has your fundamental physical error remained invisible for us? We treat your efforts being connected with the elaboration of the computer programs, which do not require profound knowledge in physics, with great respect, but we can no longer trust your results, which describe physical processes and phenomena. It is time for you to reconsider your work. We are not to be blamed for this necessity. It results from the natural process of science development.

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