The Converter of magnetic energy (CME)

1. Principle of convertion

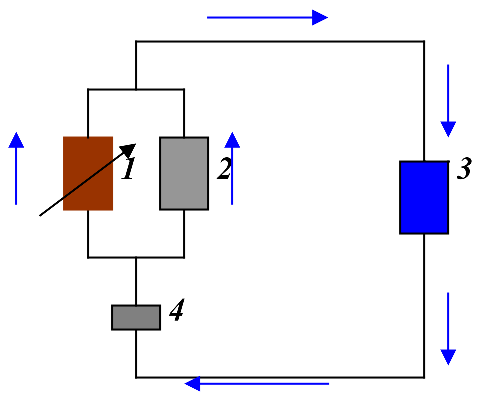

Fig.1

1-variable magnetic resistance Rmvar;
2-constant magnetic resistance Rconst;
3-magnetic flux source;
4-magnetic flux switch.

Working cycles:

1. ***Rmvar << Rconst***
2. ***Rmvar >> Rconst***

$R_m = l/\mu_o * \mu * S$; $U_m = \Phi * R_m$; $\Phi = U_m / R_m$.

$L = const$; $S = const$; $\mu_o = const$; $\mu = var$.

$\mu = f(B)$; $B = H * \mu * \mu_o$; $\mu = B / H * \mu_o$.

And so, from the above, it is clear that we can only change permeability, by changing B through H. It turns out that if "mu" decreases, the magnetic resistance increases, and the magnet flux Φ decreases. Thus, by "choosing" the path of the lowest magnetic resistance, Φ is redirected through the transforming part of the device.

2. The integrated switch of magnetic stream (InSMaSt)

After in-depth analysis, I came to the conclusion that there is only one possibility - by shunting and "releasing" the magnetic flux of a permanent magnet into the required sequence for operation.
And not only. It is also necessary that the BEMF does not act on the permanent magnet in order to avoid the demagnetization process. So that the task was to ensure that the magnetic flux of the switch was isolated from the work of the secondary (energy-giving) winding. This problem could be solved only by using a toroidal magnetic circuit. Thus, as can be seen from the attached schemes, a two-phase switch operation was obtained:

- ***operation in shunt mode and***
- ***work in the mode of saturation of the toroid switching device, redirecting the magnetic flux through the element of transformation.***

And the most important thing is that this is done with minimal energy costs.

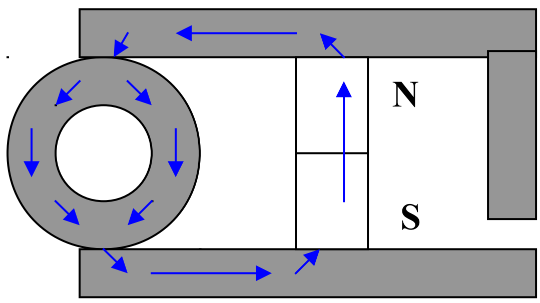

Fig.2

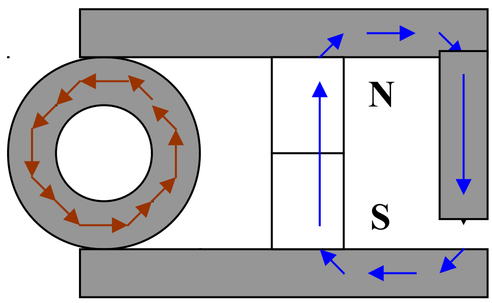

Fig.3

In Figure 2, the control pulses Uc = 0, the own magnetic flux switch = 0 and the magnetic flux of the permanent magnet closes through the toroid, i.e. he is shunted. In this case, RMS << RMET.
Figure 3 control the pulses are not equal to "zero" and the magnetic flux of the permanent magnet closes through the secondary (working, delivering energy) winding, as in this case RMS >> RMET (magnetic resistance of the conversion element).
Where

$$R_{MS} = l_{tor} / \mu * \mu_o * S_{tor} = \pi * d / \mu * \mu_o * S_{tor}, \ H/m$$

$$R_{MET} = l_d / 1.25 * S * \mu_o + l / \mu * \mu_o * S \neq l_d / 1.25 * S * \mu_o, \ H/m$$

Generally speaking, this is principle of InSMaSt - simpler, more convenient for control and for implementation.

2. Energy balance

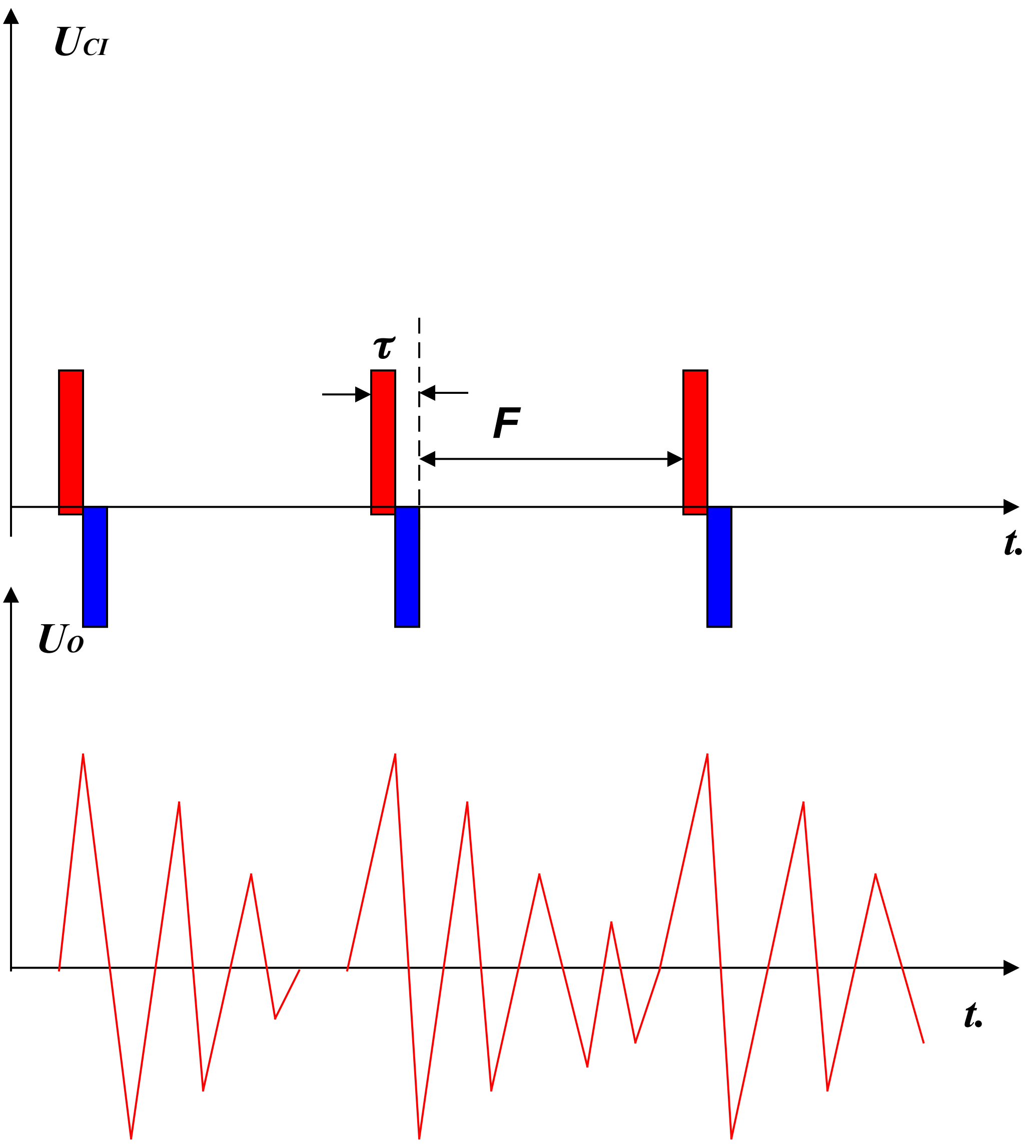

***Fig.** 4*

From the graphs shown in figure 4 shows incoming control pulses Uci and output voltage Uo, before the output of the circle brought to the optimum mode. To bring it to a state, then the output voltage is the purest sine wave. F- is the pulse repetition frequency, and τ – is the duration of the control pulse.

To determine the energy input / output ratio, do the following steps:

- *determine the duty cycle of pulses*

$$Q = 1/\tau * F;$$

- *determine the pulse power,*

$$P_{imp} = U_{imp} * I_{imp} ;$$

- *determine the average power spent on control*

$$P_m = P_{imp} / Q = U_{imp} * I_{imp} * \tau * F.$$

- *Determine output power*

$$P_o = U_o * I_o$$ **, *DC – after rectifier.***

- *determine of input / output ratio:*

$$K_{i/o} = P_m / P_o.$$

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