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INTRODUCTION OF TWO CAPACITIVE STORAGE WITH ADD POWER SOURCE IN THE RESONANT POWER AMPLIFIER

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The known relevance of solving modern problems of the electric power industry, due to the depletion of the planet's natural resources, is undeniable and initiates the development of new physical and technical solutions with the practical use of known natural phenomena.

The purpose of this work is to propose and theoretically substantiate the practical workability of a circuit diagram of a resonant amplifier of active electric power, consisting of two blocks, the successive inclusion of each of which generates an enhanced electric current in the active load, the active power of which allows you to complete the work to complete the task (for example, power electric motors, work in special-purpose devices, etc.).

The proposed work was initiated by the current energy problems, due to the depletion of natural resources and the rapidly growing needs of the global economy.

The workability of the proposed two-block circuit of a resonant amplifier of active electric power is theoretically justified with the involvement of the mathematical apparatus of the theory of circuits used to calculate transients in closed active-reactive contours.

Calculated dependences and results of analysis of the characteristics of electromagnetic processes in the charging and discharging circuits of the proposed amplifier circuit are obtained when powered by a periodic sequence of unipolar rectangular voltage pulses.

It is shown that with a pulse duration equal to a half-cycle in their repetition in a sequence, the contribution of the higher components of the excitation signal spectrum to the formation of voltage on the capacitance is very insignificant, the voltage on the capacitance increasing with time becomes constant already at $t > \frac{25}{\omega_0}$ (ω_0 – frequency), varying the charging time process, you can adjust the voltage on the capacitance. It is shown that the value of the active power gain maxima in the load is set by the quality factor of the charging circuit and can reach significant values. So, with a sufficiently high-resistance load ($R_0 \approx 25 \div 25$ Ohm) and a high quality factor of the charging circuit ($Q_0 = 50$), the active power can be enhanced by more than ~ 20 times. In general, the obtained results of calculations show that the proposed scheme has ample opportunities for amplifying active electrical power. It is noted that the amplifier circuit with two external voltage sources adopted in the analysis can be converted to power supply by one external source. Its obvious practical advantage will be an increase in the gain by ~ 2 times (due to the use of one source instead of two) with the same element base.

As an example, calculations of currents and voltages in the experimental model were made, which made it possible to formulate recommendations for the selection of elements of a real two-block active electric power amplifier with a high average value of output characteristics for any loads.