MODELING OF THE CURRENT STABILIZATION SYSTEM OF COIL TOROIDAL FIELD TOKAMAK T-11M IN THE environment of computer simulation "MICRO-CAP 11" [[1]](#footnote-1)\*)

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The capacitive energy storage and a single-switched thyristor switch with a diode crowbar are used currently in the power supply system for toroidal field coil (TFC) of the T-11M tokamak. Under these conditions, the magnitude of the TFC current and, as a consequence, the magnitude of the toroidal magnetic field are not constant at the interval of the tokamak discharge pulse. The instability of the toroidal magnetic field makes it difficult to obtain tokamak modes with specified integral plasma parameters. It is necessary to stabilize the TFC current to provide the required plasma parameters over the tokamak discharge pulse.

The paper presents two versions of TFC current stabilization systems for the T-11M tokamak:

• with partitioning of the capacitive storage;

• with a controlled thyristor switch.

The principle of operation of the circuit with partitioning of the capacitive storage is based on the sequential discharge of the sections of the capacitor banks on the TFC. The operation of the second version of the stabilization system (with a controlled thyristor switch) is based on multiple switchings of the main thyristor by connecting a switching circuit to it.

The simulations of these TFC current stabilization systems in the environment of computer simulation "Micro-Cap 11" are carried out. The simulations took into account the real parameters of the power supply system and the parameters of the TFC. The specialized controllers with TFC current feedback were developed to control the circuits.

As a results of simulations, a comparative analyzes of the proposed systems were carried out: the estimated time interval for the TFC current stabilization, the pulsations of the TFC current are presented at different references of the TFC current and different values of the initial voltage of the capacitive energy storage.

References

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1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLIX/Mu/ru/AO-Ageev.docx) [↑](#footnote-ref-1)