Short-circuit currents of a turbine generator with a split stator winding.

Liamov A. S., Smolovik S. V., Tupitsina A. L.

The differences between the equations of transient processes of turbine generators with split stator winding and the classical equations of synchronous machine are considered. Structurally, the stator windings made in such a way that they form the first phase-coinciding harmonics of the magnetic field induction in the air gap of the machine. The most significant difference is the presence of mutual inductance in the magnetic flux of the stator leakage and the mutual magnetic flux. An important task is to study the processes for short circuits on the terminals of the windings, which is necessary to assess the requirements for generator switches. In most common calculation systems (RusTab, EMTP), the model of the generator with a split stator winding is absent, and the usual calculation method is to represent this generator by two independent three-phase machines. The aim of the article is to compare the results of transient processes of a generator with a split stator winding at a three-phase short circuit on the side of the generator voltage with the results of calculations according to the scheme with two independent generators. It is shown that such modeling is not acceptable, and the greatest errors occur when determining the currents in the short circuit in the idle mode and the voltages at the terminals of the winding free from the circuit.