Mathematical model of a twelve-phase brushless machine with PMG excitation.

Adalev A. S., Kuchinskiy V. G., Pershikov G. A., Popkov E. N., Feshin A. O.

A mathematical model of a twelve-phase brushless machine in a phase coordinate system is proposed, which allows to simulate stationary modes of the machine operation taking into account the saturation of the magnet core. The macromodel of the machine is presented by the equivalent circuits of the power and mechanical subsystems, which provide the ability to connect the necessary additional equipment to the external terminals of the macromodel. As a result of modeling of the power supply system of the machine with PMG excitation, the parameters of its elements were selected to ensure the fulfillment of the established requirements on the level of impacts. The control system for the semiconductor devices were tuned. The nominal operation mode for the machine was obtained for $n = 185$ rpm.

Key words: mathematical model, macromodel, simulation model, twelve-phase brushless machine, PMG excitation, phase coordinate system, accounting the magnet core saturation.