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In the monograph, based on the Lagrange's theorems, a new method for analyzing multi-interval processes in semiconductor converters is developed by averaging their variable states and derivatives at all switching intervals. The new method allows to determine the constant and pulsation components of the processes in single-step and two-step converters, and duration of the emerging switching intervals.

Based on the results of modeling, analysis and experimental studies of multi-interval electromagnetic processes in semiconductor converters of power supplies of electrovacuum equipment, which use high-potential transformer units in their structure, we developed the recommendations for determining the optimal structures of such converters and their technical characteristics.

The results are recommended for use in the development and modernization of converters, in the electrical circuits of which there are multi-interval electromagnetic processes, as well as in the power supplies of electrovacuum equipment.