

Boost Converter Nonlinear Dynamics Control Based on Multi-Parameter Method of Linearization of the Poincaré Map

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The paper deals with operation of the algorithm of nonlinear dynamics multi-parameter control based on linearization of the Poincaré map in multistability domains applied to nonlinear dynamics control of the boost converter possessing a non-linear control characteristic. The results of mathematical simulation of the boost converter automatic control system have been presented in the form of dynamic modes maps and diagrams of the output voltage ripple swing. They confirm the efficiency of the control algorithm. It has been demonstrated that application of the considered algorithm allows to significantly decrease the output voltage oscillations magnitude in a wide range of system parameters and therefore increase the output voltage quality. The results have been obtained for the first time and may be used in the design of electrical systems based on a boost converter.