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STOCHASTIC TRANSITION PROCESSES IN THE CIRCUITS OF THE DISCHARGE PULSES SHAPER, OPERATING FOR ELECTRIC SPARK LOAD

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Abstract

An approach to the analysis of sequences of interrelated transient processes in the circuits of the discharge pulse shaper, the discharge circuit of which contains an electric-spark load with a stochastically varying active resistance, is proposed. Such load resistance is characterized by a continuous random variable with an arbitrary probability distribution (uniform, normal, or other less common distribution). The proposed approach is focused on the analysis of transient processes in circuits with variable structure, in which there is a repeating sequence of interrelated transients at stochastic change in one of the circuit parameters (for example, load resistance) in a certain continuous range. It is proposed a modification of the method of difference equations, which allows to convert the stochastic difference equation for the desired electrical characteristic of a circuit into deterministic difference equations for the expectation and variance of the desired characteristic. As an example, a transient process in a second-order circuit with a stochastic load, having a continuous uniform distribution, was considered. An analytical expression for the mathematical expectation of the capacitor voltage was obtained. R eferences 17, figures 5.

Key words: transients, capacitor charge, capacitor discharge, stochastic load, random process, probabilistic properties, continuous probability distribution.

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