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Method of polynomial predictive control of fail-safe operation of technical systems

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Abstract

In this paper there was obtained a method of the assessment of the probability of fail-safe operation of technical systems in the future instants of time. The method is based on the algorithm for modeling a posteriori nonlinear random sequence of change of values of the controlled parameter which is imposed a limitation of belonging to a certain range of possible values. The probability of fail-safe operations is defined as the ratio of the number of realizations that fell in the allowable range to the total number of them, formed as a result of the numerical experiment. The realization of a posteriori random sequence is an additive mixture of optimal from the point of view of mean-square nonlinear estimate of the future value of the parameter analyzed and of the value of a random variable, which can not be predicted due to the stochastic nature of the parameter. The model of a posteriori random sequence is based on the Pugachev's canonical expansion. The method offered does not impose any significant constraints on the class of random sequences analyzed (linearity, stationarity, Markov behavior, monotoneness, etc.). © 2015 Lviv Polytechnic National University.

Author keywords

Method of predictive control;   Random sequence

Indexed keywords

Engineering controlled terms
Microelectronics;   Stochastic systems

Engineering uncontrolled terms
Controlled parameter;   Nonlinear estimates;   Numerical experiments;   Predictive control;   Probability of fails;   Random sequence;   Stochastic nature;   Technical systems

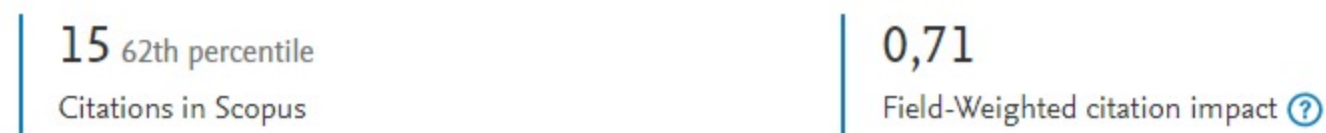**Engineering main heading**
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